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AN INVESTIGATION OF CHARACTER TRAITS IN DELINQUENT GIRLS

HAZEL M. CUSHING AND G. M. RUCH

University of Iowa

The primary purpose of the present investigation was that of determining whether group character tests of the "pencil-and-paper" type have been developed to a degree where they possess real value as diagnostic and prognostic measures in the public schools. It is unnecessary to take space to comment at length upon the usefulness of character measurements which will select potential delinquents and incorrigibles prior to the commission of acts which are subject to the action of the courts.

The first step in the validation of character test methods would seem to be that of comparing subjects actually adjudged delinquent by the courts with normal subjects of about the same ages, mentality, and social status. The position might be taken (for purposes of investigation) that any test or measurement which shows a constant and significant difference in the mean scores of two such groups does possess a certain degree of discrimination between delinquents and non-delinquents, provided a number of other factors are taken into account. One of these factors is the possibility that such differences in scores, if they are actually found, are the *result* of institutional life and not true causative traits characteristic of potential delinquency. The present study can hardly expect to settle such a question, although, as will be shown later, the attempt was made to get at this situation through correlations of character test scores with length of institutional commitment.

I. THE BATTERY OF TESTS EMPLOYED

Eight tests were selected for study after careful examination of the literature. Seven of these are adaptations or revisions of the methods of other workers and the eighth was constructed by one of the authors (H. M. C.) to investigate the general assumption that delinquents are more suggestible than non-delinquents. The eight tests are as follows:

1. Testimony (Aussage) Test. This consisted of a scene acted out by the examiner and the teacher in charge of the class of delinquent girls. The questionary was of the "yes," "no," and "can't remember" type.[1]

2. False Book Titles Test. This test was adapted from one devised by Ruch for use with boys. The present form differs only in the selection of book titles with high appeal to girls. Fifty book titles are listed, twenty of which are fictitious. The subjects were asked to mark those which they had read, the desirability of a high score being urged strongly. The score was simply the number of fictitious books marked. All false titles were carefully and repeatedly checked against book lists to insure that such titles were not real.

3. Overstatement Test. This was adapted slightly from the form built by Raubenheimer (see Terman, loc. cit.). The test is divided into two parts, the first being a simple information test in which the subject rates his knowledge on eighty factual questions as 0, 1, or 2 according to his degree of assurance of knowledge. The second part of the test (given on a different day) checks up the first statements by asking the subject actually to answer the eighty questions. The score is the amount of over- or under-statement as revealed by the two parts of the test.

4. Choice of Girl Companions. This test was built by Cushing to parallel Test 5 (Raubenheimer's *Questionable Character Test—Boys*) and is built to the same general specifications.

[1] Copies of these tests may be had from the authors upon the request of investigators who are especially interested. Tests 2 to 8 in somewhat similar forms are described in Terman, L. M., et al.: Genetic Studies of Genius, Vol. I., 1925, Stanford University Press.

Eight girl characters are described and the subjects select them in the order of her preference as a chum.

5. Choice of Boy Companions. This test was devised by Raubenheimer and was used without change.

6. Social Attitudes Test. This is an adaptation of Raubenheimer's test, changes being made in order that it might apply better to the interest of girls. It is a multiple-response test in which the subject checks the one statement which best shows how she "feels" about each of twenty-four social situation stimulus-words, e.g., Sunday schools, joy-rides, staying out late, etc.

7. Offense Rating Scale. This test, devised by Ruch, is based directly upon the Whittier Offense Rating Scale developed in order to have a more or less objective standard by which the social consequences of a crime might be evaluated. As used here, the test is intended to picture the level of moral maturity by noting the amount of deviation of the subject's judgments from socially accepted standards.

8. Psychopathic Questionary. This is the Cady adaptation[2] of the Woodworth psychopathic questionary.

Raubenheimer (Terman, loc. cit.) reports the reliability coefficients of five of the above tests as:

False Book Titles Test	0.74
Overstatement Test	0.78
Social Preference Test	0.79
Social Attitudes Test	0.77
Offense Ratings Test	0.78

In addition to the character tests, proper, the Otis Advanced Intelligence Examination, Form B was given to all subjects.

II. THE GROUPS TESTED

During the month of April, 1925, the battery of tests which has just been described was given to 127 girls in the State Training School for Girls at Mitchelville, Iowa. This number

[2] Cady, V. M.: The Estimation of Juvenile Incorrigibility, 1923, California Bureau of Juvenile Research, Whittier State School.

is about three-fourths of the total enrollment at the school. The grade range was from V to IX. All colored subjects were excluded in the statistical treatment.

A group of 79 public school girls in grades VII to XI were tested as a control group. The difference in the grade ranges in these two groups was necessary in order to secure two groups of approximately the same age.

All tests were given by one of the writers (H. M. C.).

TABLE 1

Summary of results for the two matched groups

	DELINQUENT GROUP ($N = 50$)		CONTROL GROUP ($N = 50$)		DIFFERENCES		
	Mean	S.D.	Mean	S.D.	Diff.	P.E.Diff.	$\frac{\text{Diff.}}{\text{P.E.Diff.}}$
C.A. (mos.)	194.7	15.6	191.6	12.2			
M.A. (mos.)	188.2	21.2	187.7	16.3			
I.Q.	101.2	6.6	100.9	5.7			
1. Suggestibility	4.2±0.2	2.0	7.7±0.2	2.5	3.5	0.3	11.7
2. False Book Titles	3.3±0.5	5.0	0.8±0.2	1.9	2.5	0.5	5.0
3. Overstatement	−1.8±1.1	11.8	−5.1±1.1	11.1	3.3	1.5	2.2
4. Choice of Girl Companions	10.7±1.1	11.9	8.8±0.7	7.7	1.9	1.3	1.5
5. Choice of Boy Companions	21.8±1.3	14.0	14.6±1.1	11.8	7.2	1.7	4.2
6. Social Attitudes	3.1±0.4	3.8	1.1±0.1	1.4	2.0	0.4	5.0
7. Offense Ratings	17.4±0.9	9.0	25.5±2.3	24.1	8.1	2.5	3.2
8. Questionnaire	45.6±0.6	6.4	53.5±0.7	7.6	7.9	0.9	8.8

III. THE RESULTS OF THE TESTS

Table 1 shows the mean scores, the differences of the means, the probable errors of the differences of the means, and the ratio of the differences to their probable errors for both groups, test by test. It will be noted that the numbers reported above have been reduced to two groups of 50 each *paired to equalize intelligence.*

Examination of table 1 shows that all of the obtained differences are probably significant except Tests 3 (Overstatement) and 4 (Choice of Girl Companions). Choice of boy companions

TABLE 2

Bi-serial r's for all tests

TEST	r
1. Testimony (Suggestibility)	0.62
2. False Book Titles	0.40
3. Overstatement	0.13
4. Choice of Girl Companions	0.12
5. Choice of Boy Companions	0.33
6. Social Attitudes	0.41
7. Offense Rating	0.27
8. Psychopathic Questionnaire	0.60

TABLE 3

Intercorrelations of all tests and traits

	C.A.	M.A.	L.C.*	1	2	3	4	5	6	7
M.A.	0.11									
L.C.*		0.09								
1	0.09	−0.50	−0.11							
2	0.03	−0.03	−0.01	0.14						
3	0.08	−0.09	−0.08	0.17	0.42					
4	0.02	−0.30	−0.09	0.12	0.12	0.14				
5	−0.20	−0.34	−0.12	0.21	0.24	0.16	0.50			
6	−0.22	−0.33	−0.10	0.08	0.23	0.14	0.44	0.55		
7	0.05	−0.38	−0.05	0.38	−0.03	0.18	0.25	0.22	0.28	
8	0.03	0.15	0.19	−0.03	−0.05	−0.10	0.00	−0.13	−0.18	0.09

* L.C. indicates length of commitment to the institution. The average L.C. was eighteen months.

seems to be more diagnostic than choices of companions of the same sex.

Table 2 presents bi-serial *r*'s for each test correlated against the two categories (Delinquent or Non-delinquent). Since the test scores on the various tests formed relatively normal

and continuous distributions, and the delinquent *vs.* non-delinquent classification is dichotomous, it is thought that these bi-serial *r*'s have sufficient validity to be worth quoting.

Table 2 is in full harmony with the results of table 1.

Table 3 presents the intercorrelations of all tests and traits.

In examining table 3, it should be borne in mind that, with the exception of Test 1 (Suggestibility) and Test 8 (Psychopathic Questionnaire), a low score means that the subject did well on the test; conversely, a high score indicates the possession of the undesirable trait in high degree.

The majority of the correlations point toward a relatively low degree of relationship between the various tests; meaning that they measure more or less discrete functions. The correlation of 0.50 between suggestibility and mental age suggests that the ability to observe and report is related to general intelligence. As might be expected, the two overstatement tests (Test 2, False Book Titles and Test 3, Overstatement) show considerable overlapping ($r = 0.42$). Likewise, and with apparent reason, the two choice of companions tests show some correlation ($r = 0.50$). Intelligence seems to show some relation to ability to rate offenses (Test 7).

Length of commitment has no bearing on the results of the tests. Whatever this item is worth as a criterion of the possibility of the wrong reactions being learned in the institution, it failed to correlate significantly with any of the test materials. L.C. may be worthless as a measure of learning within the institution. On the other hand, L.C., if accepted as a valid criterion, will not explain the unsocial and undesirable reactions of the delinquent group on the tests.

IV. CONCLUSIONS

1. Six of the eight tests employed would appear to be worthy of further study.

2. The "character" tests employed are reasonably discrete from one another and from intelligence with two possible exceptions (omitting the observed relationships which are

a priori to be expected in the cases of the two overstatement or honesty tests and the two choice of companions tests).

3. The undesirable showing of delinquent girls in comparison with normal girls is not to be explained upon a basis of unsocial learning after commitment; if length of a commitment is a valid measure of such learning.

FURTHER STUDY OF WANT VERSUS COMMODITY ADVERTISEMENTS

E. K. STRONG, JR., AND H. R. LASLETT

Stanford University

Advertisements may be constructed in such a way and may so emphasize certain situations and facts as to bring into the reader's mind all of the thoughts and feelings that are necessary to lead him to buy. On the other hand, it is unfortunately very easy so to select items for emphasis or as "approaches" to the readers' interests that few responses to the advertisement are obtained.

A new note in advertising and selling is expressed by the words "permanent satisfaction." Within very recent years leaders in these fields have learned to appreciate the fact that repeat sales are the profitable sales. The single sale made with some degree of cleverness, adroitness, or even slipperiness, is temporarily profitable to the transient individual, but few permanent business organizations can be founded on such a basis. In order to aid in the establishment of an enduring business organization through permanent satisfaction one must know the best points upon which to place the emphasis in advertisements.

It has previously been pointed out that there are two major objectives in advertising: first, to make a reader *want;* and second, to give a *solution* showing how his desire may be adequately satisfied by means of the advertiser's commodity.[1]

Obviously when prospective buyers are not familiar with an advertised commodity, it is necessary that the commodity and its uses be emphasized in terms of its power to satisfy the

[1] E. K. Strong, Jr.: Psychology of Selling and Advertising; Also by Strong and J. E. Loveless: "Want" and "Solution" Advertisements, Journal of Applied Psychology.

buyer's wants. Such advertisements are called "want" advertisements. But when the reader is familiar with a commodity the usual procedure has been to emphasize the trade-name and to dwell upon the intrinsic values of the particular brand of that commodity. That the latter procedure is not justified has been shown by Strong and Loveless, since they found that "want" advertisements are superior to "solution" advertisements even when the efficiency is measured not in terms of desire to buy but in terms of the memorability of the trade-name. This conclusion is all the more valid since in the want advertisements the trade names are mentioned on the average only half as frequently as they are in the commodity advertisements. If we find that people not only read more copy but remember the trade names more often under these conditions, the situation is, indeed, a striking one, as it would indicate that readers are not only induced to buy, but are induced to buy a particular brand of article more frequently by the want type of advertisement.

This report presents further data on this point. Memorability of the trade-name is measured in still another manner. In addition data are given showing the extent to which copy is read depending upon whether the "want" or the "solution" is emphasized in the advertisement.

PROCEDURE

The experimental procedure was that described in the article of Strong and Loveless, except as noted below.

The advertisements used in the experiments, it will be recalled, were not taken from magazines or other printed matter, but were written especially for use in experiments of this nature. They were of approximately the same length, same lay-out, and same degree of interest insofar as this is possible at the present time. They were written so as to be as equal as possible in all things except the *want* or the *commodity* factor. Even in this factor the advertisements were not purely of the one type or the other, but in the one type of advertisements the *want* factor was the dominant one, and in the other

type the *commodity* factor was given the greater emphasis. To have made the advertisements strictly of the one type or the other would have spoiled them as advertisements. (Twelve of the forty advertisements were reproduced in the article by Strong and Loveless, two more are given in figs. 3 and 4.)

These advertisements were split into two groups, so that Set A contained ten "want" advertisements, ten "solution" advertisements and ten extraneous advertisements, while Set B contained the corresponding ten "solution" and ten "want" advertisements together with the same ten extraneous advertisements. For example; in Set A the Danton Motor Car advertisement was a want advertisement, in Set B the Danton advertisement was a commodity advertisement; in Set A the Dixol Antiseptic advertisement was a commodity advertisement, in Set B, a want advertisement. The ten additional advertisements were included merely to make the task of reading more difficult and to insure that all the advertisements would not be carefully read.

The subjects were 108 men and 18 women from the general psychology class. They did not know the purpose of the experiment and had not seen the advertisements before. They were acquainted with one of the writers and showed unmistakable interest in the experiment.

The advertisements were presented to the students with the following instructions:

> We have here a set of made advertisements. They do not appear in the magazines at all. I want you to look them over as you would a magazine. Turn each page. Read the advertisements just as you want to. Read all of one or none of it, but keep busy. You will have just 20 minutes to look over the whole lot so you can not read all of the advertisements, nor do I want you to. This is not an intelligence test of any sort, nor is there any particular way to do well or poorly. Just read the advertisements that interest you and let it go at that.

The plan was that their conduct in looking over the advertisements should be as nearly like that of an individual in the home or library as possible. The number of students having Set A

of the advertisements was approximately equal to the number having Set B.

After the sets of advertisements had been collected, the

Name.....

Make a check mark beside those paragraphs that you are ABSOLUTELY SURE you have seen. Do nothing to the others.

1.

"Why, you've been sitting on your bed all evening long," the hostess smiled. "That.....Davenport Bed has a lovely bed in it, bedclothes and all. And it's ready in a jiffy. Just look! I'll open it out for you." ( )

There are numerous occasions when a.....is indispensable. In daytime and evening it functions perfectly as a beautiful and luxurious davenport. And, when needed, its restful, comfortable bed is quickly and easily made ready. check here .....

2.

By day the.....adds a new beauty and individuality to your car. Its graceful, well-balanced proportions harmonize with any type of body. ( )

Because the.....is instant and accurate, giving light when and where you most need it, you will find it your greatest after-sunset insurance. It is often all there is between you and disaster. check here .....

3.

The oven bottom is cast-iron, a material that distributes the heat evenly to all parts of the oven. The..... Heat Regulator maintains any required temperature and leaves you free for other tasks. The U-shaped oven burner gives a perfect broiling flame, and affords another way of serving many foods in more wholesome form. ( )

There is a.....Gas Range just suited for your requirements. check here .....

FIG. 1. PAGE 1 OF RECOGNITION OF PARAGRAPH TEST

"recognition of paragraphs" test booklets were given to the students. A sample of the first page is given below. The instructions were, first, to check all of the advertisements which they were sure that they had seen, and, second, to write in the

trade name of the article advertised on the line at the side of the paragraphs given. These booklets contained the last paragraph (or paragraphs, if they were short) of all of the advertisements in both Sets A and B. These were arranged in a chance order. The paragraphs in this recognition of paragraph test were identical line for line with the same paragraphs in the advertisements except for the omission of the trade names which were indicated by six underscore lines in every case. The writers thought that if these lines were of different lengths they would serve as cues or as false suggestions to the readers. Fifteen minutes were given to this part of the experiment. From this blank two sets of data are drawn: first, the number of check marks for each paragraph. These measure the extent to which the copy is identified by the students. No attention was given to check marks opposite paragraphs which the student could not have seen.[2] Second the number of trade-names that were written opposite check marks. If the trade-name was correct it was given a credit of 1, if it was incorrect but recognizable by the ordinary retail clerk it was given a credit of ½. Incorrect trade-names were not considered.

The last part of the experiment consisted of a "recognition of sentence" experiment. Below are shown five sample sentences from the first page of the test blank. For this experiment a series of one hundred and twenty sentences was prepared, consisting of (1) forty sentences taken from the advertisements of Set A (not using filler advertisements), (2) forty sentences taken from Set B, and (3) forty sentences not contained in either set but related to the articles contained in them. For the eighty *true* sentences from the two sets the writers chose usually the first sentence or the last "clinching" sentence but occasionally they chose the first sentence of the second or third paragraph as a more striking and important sentence.

[2] Each student handled only twenty of the forty advertisements under consideration. Some readers apparently reasoned from context, for example, they had seen an advertisement for Logan Lawn Mowers. In the experiment, then, any advertisement for lawn mowers must mean Logan and so many of them wrote Logan.

The sentences were as nearly equal in value and length as it was possible to make them. They were listed in a chance order as to succession of solution and of want advertisements and as to the sets from which they were taken. For example, the sentences from the Danton want advertisement were placed as numbers 1 and 113 in the series; those from the commodity advertisement as numbers 97 and 119. The sentences which were inserted, but which were not included in either of the original advertisements were placed as numbers 34 and 57.

Name.....

Below are a number of statements. Circle the *R* opposite each statement that you remember having read. Circle the *N* if you declined to read the advertisement or if you have forgotten or did not see the statement.

1. R N My Danton Car holds the road with something akin to instinct.
2. R N A new steamer, unsurpassed in construction, equipped with every modern feature for passenger comfort....."The Empress of Cumberland."
3. R N The ideal antiseptic for counteracting acid irritations of the throat and mouth is the ALKALINE Dixol.
4. R N Comfo Davenport Bed.....The "Invisible Bedroom" proves itself a friend in need.
5. R N Because of the blending of light and shade you get an exquisite artistic effect with Glow-Tone Window Shades.

FIG. 2. PAGE 1 OF THE RECOGNITION OF SENTENCE TEST

In front of each sentence were the capital letters R and N, one of which the reader was to encircle, the R if he remembered or thought that he remembered the sentence, the N if he did not remember it or had not seen it. The time given to this part of the experiment was twelve minutes. The students were all familiar with the true-false type of test and were, therefore, not handicapped by the factor of novelty.

The possible score on this experiment was 40, one for each sentence which the reader could have remembered and which

he did remember. No penalty was used for incorrect responses as there was no tendency for the subjects to mark sentences in a rash or wholesale manner, and, in addition there were two sentences which the reader could not have seen for each one which he could have seen, that is, there were twice as many F's as T's, if we speak in terms of true-false tests. The tendency of the readers as a whole was to be overcautious in encircling the R's marking the sentences as remembered.

RESULTS

Table 1 presents the data from the *Recognition of Paragraphs Experiment.* For example, 57 per cent of the students recognized the paragraph of copy from the "want" advertisement of the Empress Cumberland Mediterranean Trip and 60 per cent from the "solution" advertisement, in this case giving a superiority of 3 per cent for the "solution" advertisement. The average for the twenty pairs of advertisements was 44.6 per cent for the "want" advertisements and 37.0 per cent for the "solution" advertisements. Expressed in terms of ratios this is 120 to 100 in favor of the want advertisements.

Unfortunately when the paragraphs were distributed by "chance" it happened that nine of the last twelve paragraphs on the test sheet were from "want" advertisements. As there was a steady decline in the percentages of recognition of paragraphs from first to last on the test blank,[3] these want advertisements were penalized because of their position on the blank. To offset this factor weights were calculated for each of the forty positions on the test blank. These amounted to −13 for paragraph number one, 0 for paragraphs number twenty and twenty-one, and +13 for paragraph number forty. Thus in the case of the Empress of Cumberland want advertisement whose paragraph appeared as number 33 on the test blank, a weight of +8 was added to the percentage of 57 giving a total 65 (see column 4 of table 1), while a weight of −7 was added

[3] The first ten paragraphs averaged 51 per cent; the second ten, 46 per cent; the third ten, 37 per cent; and the fourth ten, 33 per cent.

TABLE 1

Per cent of subjects who Recognized the Paragraphs of copy from "want" and "solution" advertisements

ADVERTISEMENTS	"RAW" DATA			"WEIGHTED" DATA		
	Want ads	Solution ads	Superiority of Want ads over Solution ads	Want ads	Solution ads	Superiority of Want ads over Solution ads
Empress of Cumberland Mediterranean Cruise	57	60	−3	65	53	12
Dixol Antiseptic	62	45	17	66	39	27
Thorobred Dog Biscuit	62	43	19	56	49	7
Durex Battery	42	29	13	37	36	1
Fireside Tomato Soup	57	60	−3	65	56	9
Comfo Davenport Bed	71	55	16	59	51	8
Lista-Blanca Tooth-paste	33	53	−20	38	50	−12
Mercury Auto Safety Light	38	33	5	35	22	13
Rayite Auto Enamel	45	23	22	35	21	14
Logan Lawn Mower	45	31	14	43	24	9
Vapite Firefoam	57	40	17	48	39	9
Mytho Hair Color Restorer	55	38	17	61	38	23
Satinette Enamel	32	24	8	32	27	5
Dixie Ranges	45	31	14	46	21	25
House of Burgundy Silverware	34	28	6	36	39	−3
Good Luck Garden Hose	79	32	47	70	34	36
Glow-tone Window Shades	11	36	−25	20	28	−8
Danton Automobile	12	33	−21	22	25	−3
Tru-Flex Bedsprings	7	34	−27	18	38	−20
Kool-Kraft Suit	47	11	36	57	23	34
Averages	44.6	37.0	7.6	45.5	36.2	9.3
Ratios	120	100		126	100	

to the percentage of 60 (solution advertisement) because this paragraph appeared as number 9 on the test blank. When these weightings are employed the final ratio of 126 to 100 in favor of want over solution advertisements is obtained.

TABLE 2

Per cent of subjects who Recognized the Sentences of copy from "want" and "solution" advertisements

	SET A		SET B		SUPERIORITY OF WANT OVER COMMODITY ADVERTISEMENTS
	Want advertisement values	Commodity advertisement values	Want advertisement values	Commodity advertisement values	
Empress of Cumberland Cruises		68	50		−19.5
		36	15		
Dixol Antiseptic		30	63		
		8	52		38.5
Thorobred Dog Biscuits	21			60	
	57			24	−3.0
Durex Batteries	64			8	
	57			34	39.5
Fireside Tomato Soup		21	73		
		17	24		29.5
Comfo Davenport Beds		21	66		
		15	48		39.0
Listo-Blanca Tooth-Paste		40	45		
		47	27		−7.5
Mercury Auto Safety Light	36			37	
	38			34	1.5
Rayite Auto Enamel		9	34		
		21	29		16.5
Logan Lawn Mowers	9			26	
	13			29	−16.5
Vapite firefoam extinguisher		21	47		
		17	37		23.0

TABLE 2—*Continued*

	SET A		SET B		SUPERIORITY OF WANT OVER COMMODITY ADVERTISEMENTS
	Want advertisement values	Commodity advertisement values	Want advertisement values	Commodity advertisement values	
Mytho Hair Tonic		36	15		
		34	42		−6.5
Satinette Enamel	32			6	
	34			15	22.5
Dixie Ranges	59			13	
	19			11	27.0
House of Burgundy Silverware	34			37	
	30			34	−3.5
Good Luck Garden Hose		32	42		
		19	66		28.5
Glow-Tone Window Shades	38			26	
	38			11	19.5
Danton Autos	32			13	
	11			8	11.0
Tru-flex Bedsprings	45			27	
	26			21	11.5
Kool-Kraft Suits		28	35		
		21	39		12.5
Averages	34.5	27.1	42.5	23.7	
Averages of Sets A and B			38.5	25.4	13.1
Ratios			152%	100%	

According to this recognition of paragraph test students will read and remember 26 per cent more of "want" copy than "solution" copy.

Table 2 presents the data from the *Recognition of Sentences Experiment.* As pointed out above each reader could have seen two sentences from each of the twenty advertisements in the set which he had, consequently there are two percentages, or score values, opposite each trade-name in the table. The data from the 53 students who handled the advertisements in Set A are presented in the first two columns, the data from the 62 students who handled Set B appear in the third and fourth columns. The fifth column gives the difference between the percentages from want and commodity advertisements, utilizing all the data from Sets A and B. On the average 38.5 per cent of students recognized sentences from want advertisements while only 25.4 per cent recognized sentences from solution advertisements; a difference of 13.1 per cent in favor of the want advertisements. Expressed in terms of ratios we have 152 to 100 in favor of want advertisements.

Here also there is a noticeable falling off in the percentage of sentences recognized as we proceed from the first sentences in the test blank to the last sentences. The first ten were recognized to the extent of 45.2 per cent, the last ten to only 28.4 per cent. If a correction were made for this factor of position in the test blank, the scores opposite each advertisement would be altered, but the summary scores would not be appreciably changed because in this case the want and solution sentences were distributed equally throughout the test blank.

We may conclude then that a *student will read and later recognize 39 per cent (26 + 52)/2 more of copy taken from want advertisements than from solution advertisements.*

Table 3 presents data from the *Recall of Trade-name Experiment.* It will be recalled that after the student had checked the paragraphs he recognized he was asked to write opposite these paragraphs the trade-names that were advertised. The first two columns give the per cent of students who recalled the trade-names from want and from solution advertisements, respectively. The third column gives the differences between these columns. On the average 15.8 per cent recalled trade-names from want advertisements as compared with 14.5 per

cent from solution advertisements. This gives 9 per cent superiority for the former. If these data are weighted for

TABLE 3

Per cent of subjects who Recalled the Trade-names when shown paragraphs from want and solution advertisements

	"RAW" DATA			"WEIGHTED" DATA		
	Want ads	Solution ads	Superiority of Want over Solution ads	Want ads	Solution ads	Superiority of Want over Solution ads
Empress of Cumberland Mediterranean Cruise	26	31	−5	28	29	−1
Dixol Antiseptic	21	16	5	22	15	7
Thoroughbred Dog Biscuit	32	29	3	31	30	1
Durex Battery	12	10	2	11	12	−1
Fireside Tomato Soup	20	42	−22	22	41	−19
Comfo Davenport Bed	35	21	14	32	20	12
Listo-Blanca Toothpaste	13	25	−12	14	24	−10
Mercury Safety Auto Light	8	9	−1	7	6	1
Rayite Auto Enamel	5	0	5	3	0	3
Logan Lawn Mower	11	8	3	11	9	2
Vapite Firefoam	22	21	1	20	21	−1
Mytho Hair Color Restorer	9	6	3	10	6	4
Satinette Enamel	9	6	3	9	7	2
Dixie Range	6	12	−6	6	10	−4
House of Burgundy Silverware	8	5	3	8	8	0
Good Luck Garden Hose	32	6	26	30	6	24
Glow-tone Window Shade	5	2	3	7	0	7
Danton Auto	17	23	−6	19	21	−2
Tru-flex Bedsprings	2	5	−3	4	6	−2
Kool-Kraft Suit	22	13	9	24	16	8
Averages	15.8	14.5	1.3	15.9	14.4	1.5
Ratios	109	100		110	100	

position on the test blank, as was done in connection with table 1, the weighted percentages are as given in columns four to six

of table 3. This gives a superiority of 10 per cent for want advertisements when efficiency is measured in terms of memorability of trade-names.

Strong and Loveless reported data on this point, measuring the memorability of trade-names in four ways, i.e., by pure recall of the names, by recognition of the names considering (*a*) correct recognitions only and (*b*) correct minus incorrect recognitions, and by recall of the names when the commodities were mentioned. Combining the results from these four methods with the fifth method used here we have expressed in the form of ratios:

Recall	116–100
Recognition, correct only	104–100
Recognition, correct minus incorrect	110–100
Recall, when commodity is mentioned	115–100
Recall, when a paragraph is presented	110–100
Summary	111–100

This summary of 11 per cent superiority of want over solution advertisements when measured in terms of the memorability of trade-names is based on data from five groups of subjects, totaling in all 372 men and women.

EXCEPTIONS TO THE RULE

In each of the tables in this report and that of Strong and Loveless there are several cases where the solution advertisements scored higher than the corresponding want advertisements. Is there any explanation for this? Do the exceptions mean that the general principle that want advertisements are superior to solution advertisements is true in the main but not in every case, or that these exceptions are merely expressions of the unreliability of the experimental procedure?

In table 4 are gathered together all the data bearing on this point. Each figure represents a difference between a pair of want and solution advertisements in one test. The first five columns give such differences when the memorability of the trade-name is measured, the sixth column a summary of these

TABLE 4

Superiority of Want over Solution advertisements in the seven tests

Each figure is the difference between Want and Solution advertisements for the trade-named commodity listed

	RECALL	RECOGNITION (CORRECT ONLY)	RECOGNITION (CORRECT-INCORRECT)	RECALL, COMMODITY NAMED	RECALL, PARAGRAPH SUPPLIED	AVERAGE, COLUMNS 1–5	RECOGNITION OF PARAGRAPHS	RECOGNITION OF SENTENCES	AVERAGE, COLUMNS 7, 8	AVERAGE, COLUMNS 1–5, 7, 8
Empress of Cumberland Mediterranean Cruise...	−3	8	10	2	−1	3.2	12	−20	−4.0	1.1
Dixol Antiseptic	13	11	5	11	7	9.4	27	39	33.0	18.6
Thoroughbred Dog Biscuit	32	5	2	−9	1	6.2	7	−3	2.0	5.0
Durex Battery	6	4	6	1	−1	3.2	1	40	20.5	8.1
Fireside Tomato	−9	7	1	2	−19	−3.6	9	30	19.5	3.0
Comfo Davenport Bed	16	13	2	7	12	10.0	8	39	23.5	13.9
Lista-Blanca Tooth paste	−1	4	1	1	−10	−1.0	−12	−8	−10.0	−3.6
Mercury Safety Auto Light	2	2	−9	6	1	0.4	13	2	7.5	2.4
Rayite Auto Enamel	−6	7	1	5	3	2.0	14	17	15.5	5.9
Logan Lawn Mower	−11	2	9	−10	2	−1.6	9	−17	−4.0	−2.3
Vapite Firefoam	1	−1	5	11	−1	3.0	9	23	16.0	6.7
Mytho Hair Color Restorer	4	0	10	11	4	5.4	23	−7	8.0	6.4
Satinette Enamel	−20	−8	−1	−14	2	−8.2	5	23	14.0	−1.9
Dixie Range	20	−10	−2	−6	−4	−0.4	25	27	26.0	7.1
House of Burgundy Silverware	−1	−7	−8	−3	0	−3.8	−3	−4	−3.5	−3.7
Good Luck Garden Hose	28	9	6	12	24	15.8	36	29	32.5	20.6
Glow-tone Window Shade	7	15	17	5	7	10.2	−8	20	6.0	9.0
Danton Auto	25	5	6	22	−2	11.2	−3	11	4.0	9.1
Tru-flex Bedsprings	7	1	−9	10	−2	1.4	−20	12	−4.0	0
Kool-Kraft Suit	−11	0	1	8	8	1.2	34	13	23.5	6.6
Average	5.0	3.4	2.7	3.6	1.6	3.2	9.3	13.3	11.3	5.6

five columns; the seventh and eighth columns give the differences when recognition of the copy is measured, the ninth column a summary of these two columns; and the last column a summary of all seven tests.

In three cases (House of Burgundy Silver, Lista Blanca Toothpaste, and Logan Lawnmower) the solution advertisements are shown to be superior in all these summaries. The advertisements of the first and third of these pairs were repro-

Name.....

Do Others Like You?

We all want to be well liked. To be able to make people like you is an asset that pays well. Yet, it is so easy to get off on the wrong foot—whether it be in an important business contact or simply in a casual social meeting.

For example, quite unconsciously you watch a person's teeth when he or she is in conversation with you. If they are unclean, improperly kept, and if you are a fastidious person, you will automatically hold this against them. And all the while this same analysis is being made of you.

Listo-Blanca Tooth Paste cleans teeth a new way. At last our chemists have discovered a polishing ingredient that really cleans without scratching the enamel—a difficult problem—solved at last.

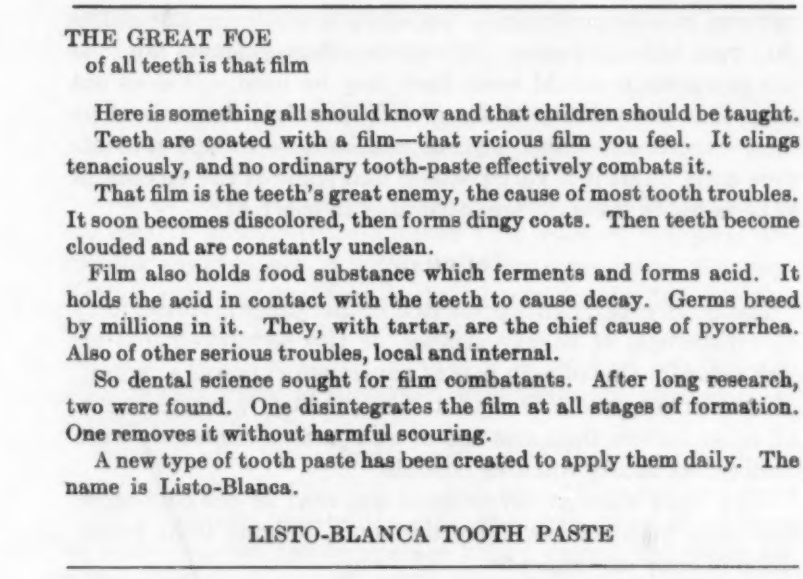
You will notice the improvement even in the first few days. And you will know it is cleaning safely.

LISTO-BLANCA TOOTH PASTE

FIG. 3. ADVERTISEMENT 22 W, EMPHASIZING THE WANT ELEMENT

duced in the article by Strong and Loveless. Those of the second pair are given below. The want and solution advertisements typify what is intended; and there seems to be no explanation in terms of irregularity of experimental procedure. It is possible that the explanation lies in the fact that most of the subjects in these experiments were men and that the mechanical and scientific features stressed in the solution advertisements were of more interest than appeals to proper arrangement of salad forks on the table, to making people like you because of

good teeth, and to keeping grass as one does a carpet. Unfortunately no record was kept of the sex of the subjects except in the case of the first group of thirty subjects all of whom were



THE GREAT FOE
of all teeth is that film

Here is something all should know and that children should be taught.

Teeth are coated with a film—that vicious film you feel. It clings tenaciously, and no ordinary tooth-paste effectively combats it.

That film is the teeth's great enemy, the cause of most tooth troubles. It soon becomes discolored, then forms dingy coats. Then teeth become clouded and are constantly unclean.

Film also holds food substance which ferments and forms acid. It holds the acid in contact with the teeth to cause decay. Germs breed by millions in it. They, with tartar, are the chief cause of pyorrhea. Also of other serious troubles, local and internal.

So dental science sought for film combatants. After long research, two were found. One disintegrates the film at all stages of formation. One removes it without harmful scouring.

A new type of tooth paste has been created to apply them daily. The name is Listo-Blanca.

LISTO-BLANCA TOOTH PASTE

FIG. 4. ADVERTISEMENT 22 S, EMPHASIZING THE SOLUTION ELEMENT

adult women (not college students). The superiority of want advertisements in these cases were:

	RECALL	RECOGNITION (CORRECT ONLY)	RECALL, COMMODITY NAMED	AVERAGE
House of Burgundy	14	13	33	20
Lista Blanca	20	20	20	20
Logan	7	−20	7	−2

These data suggest that the exceptions are due to the fact that men were used in the experiments and that if the advertisements had been tested by women the results would have been otherwise.

This point brings us again to the old problem as to whether it is fair to test advertisements upon college students. Undoubtedly the fairest test in most cases must be upon people who are *bona fide* prospects. Consequently commodities advertised to women should be tested upon women, commodities that men buy upon men. Wherever college students are *bona fide* prospects it would seem they may be used. It does not seem that the validity of the general principle determined by these experiments can be questioned because college students were used. But it is very possible that some of the exceptions to be noted in the data are attributed to this fact.[4]

SUMMARY

The three experiments presented in this paper involved forty advertisements of twenty articles, or two advertisements for each article. One of each pair of advertisements was a "want" advertisement, and one was a "commodity" advertisement. All other factors than this one of *want* versus *commodity* were rendered as nearly equal as possible.

Copy from want advertisements was read 39 per cent more than that from solution advertisements, judging from recognition of copy experiments.

The trade-names of want advertisements were remembered 11 per cent more than from solution advertisements, judging from five tests of the memorability of trade-names.

"The most efficient advertisements, other things being equal, are those that arouse a want for the commodity, even when the efficiency is measured not in terms of desire to buy, but in terms of the memorability of the trade-name."

[4] In five other cases solution advertisements appear to be superior to want advertisements according to the summaries in either column six or column nine of table 4 but not in the other columns. In the case of Satinette Enamel, it would seem that the solution advertisement stresses the want element far more than was intended and as a result this solution advertisement is actually superior to the want advertisement. The paragraph from the want advertisement of Truflex Bed springs was ambiguous, taken out of its context, and hardly suggested beds at all. If the data from this test were eliminated the summaries would be 2.3, 12.0 and 4.2. Similar explanations can be advanced for the remainder of these exceptional cases.

MEMORY AS AFFECTED BY ISOLATION OF MATERIAL AND BY REPETITION

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Though there is general agreement that the effectiveness of the size of advertisements varies as a root of the area, the reasons assigned are variable, including magnitude, isolation, lack of counter-attraction, better chance for display, prestige of firm, familiarity, and the greater amount of time spent on full page advertisements. Here is a fertile field for research. The present paper is concerned with isolation, or absence of counter-attraction.

Strong,[1] who has already approached the problem in an ingenious way, showed that the half page, when isolated so as to fill a full page, was on the average almost twice as effective as a half page on the same sheet with a second half page, the ratios being 1.83 to 1.00. The lower half page gained more than the upper, 1.90 to 1.76. In general the poorer advertisements gained more by isolation. The advertisements were identical in the two experiments, hence the gain must be attributed to the surroundings, or to elements which were by-products of the changed surroundings. Three obvious differences appear: First, the increased amount of white space; second, the novelty of a half page advertisement centered in a full page space; and third, the increased amount of space devoted to the advertisement. Since Strong has shown, when his technique is used, that the efficiency of size varies as the square root of the area, a full page should be 1.41 times as

[1] Strong, E. K., Research Bulletin No. 1, Association of National Advertisers. Quoted by Poffenberger, Psychology in Advertising, pp. 227–232.

effective as the half. Subtracting this figure from 1.83, obtained for isolation, the difference, 0.42, may be attributed to the other variants.

Instead of repeating Strong's experiment, it was thought advisable to modify it in several particulars. Familiar four-letter words would give material more homogeneous than advertisements; the novelty factor would be practically eliminated; the space occupied by a word is so slight, amounting to only $\frac{1}{1500}$ of the area of the page, that the effect of the white space is reduced to a minimum. If a word appears alone on a page, it is isolated; if two or four words appear on a single page, the words are no longer isolated, though the difference in the amount of white space occupied is negligible. The experiment was a modification of Strong's[2] familiar four dummy experiment. The material was as follows:

12 words occupying full pages and appearing 4 times
12 words occupying full pages and appearing 2 times
24 words occupying full pages and appearing 1 time

12 words occupying half pages and appearing 4 times
12 words occupying half pages and appearing 2 times
24 words occupying half pages and appearing 1 time

12 words occupying quarter pages and appearing 4 times
12 words occupying quarter pages and appearing 2 times
24 words occupying quarter pages and appearing 1 time

No margin lines or lines separating words were used in this experiment. Their influence will be discussed in a later paper. The procedure was much the same as in Strong's experiment I. The four dummies constituting the series were read through at one sitting, the rate of reading being optional with the subject. The recognition test followed immediately after the reading.

The test material consisted of two mimeographed sheets, containing a list of 288 words, the 144 contained in the dummies, and 144 new ones which were added in a chance order. The

[2] Strong, E. K., Journal of Experimental Psychology, vol. 6, pp. 335ff.

method of scoring was as follows: If the subject was certain that a given word had appeared in any of the four dummies, he was to mark it 5, moderate, though not absolute certainty was marked 4, guess work was marked 3, moderate certainty that the word had not appeared in any of the dummies was marked 2, and absolute certainty 1.

The subjects, volunteers from the elementary course in psychology, numbered 100, 50 men and 50 women.

TABLE 1

SIZE	NUMBER OF APPEARANCE	1	2	3	4	5
1/4	1	545	291	225	364	975
1/2	1	526	318	211	293	1,052
1/1	1	541	269	224	283	1,083
Totals.....		1,612	878	660	940	3,110
1/4	2	172	101	89	143	695
1/2	2	208	124	101	162	605
1/1	2	175	110	86	143	686
Totals.....		555	335	276	448	1,986
1/4	4	107	70	52	120	851
1/2	4	111	62	67	119	841
1/1	4	84	55	49	110	902
Totals.....		302	187	168	349	2,584

The results are given in the form of tables of distribution, showing how many times the various values from 1 to 5 were given to each of the sizes and frequencies. The results of the men and of the women are combined, for no essential differences appear, except that women give a noticeably higher total of certainty judgments than do the men, the totals being 5636 to 4523 respectively. (See table 1.)

The most obvious way of treating the results is to divide the number of recognitions by the total number of cases, thereby obtaining percentages. To do this, we add together the fre-

quencies in classes 4 and 5, and divide by the total number of measurements. Strong's method, which involves subtracting failures to recognize from recognitions and dividing the remainder by the number of cases was not sed. To penalize for failure to recognize means that each failure is counted twice. Recognition value = number − failures: then recognition − failures = number − failure − failure. This may measure *excess* of recognition over failure to recognize, but is not a proper measure of recognition as such. When we try to combine, as Strong did, recognition value and excess of recognition by multiplying the two amounts, the product is an anomolous measure.

TABLE 2

SIZE	NUMBER OF APPEARANCES			AVERAGE
	1	2	4	
1/4	55.7	69.7	81.0	68.8
1/2	56.0	63.9	80.0	66.6
1/1	56.9	69.0	83.5	69.8
Average....	56.2	67.5	81.5	

The percentages in table 2 were obtained.

These averages for quarter, half, and full page arrangements of words show that there are slight differences, probably too slight to be of any significance.

We may conclude from this part of the experiment, that the isolation of a single word on a page has no effect upon its recognition value, under the conditions outlined. Other factors must be responsible for the result usually found in advertising experiments.

On the other hand, the averages indicate that repetition is effective, the ratios for one, two, and four appearances being 1.00, 1.20, and 1.45 respectively. These ratios are closer to the 4th root of the number of appearances than to the cube root suggested by Strong.

A somewhat different problem deserves mention. It will be recalled that four dummies were used in the experiment. Of

the words appearing only once in the whole experiment, exactly one quarter appeared in each of the dummies. Six quarter, six half, and six full page words are found in dummy A, making a total of 18. A similar situation exists for the other three dummies. The distribution of the values given the words in the four dummies is shown in table 3.

TABLE 3

DUMMY	1	2	3	4	5
A	431	238	178	212	741
B	444	248	166	238	704
C	384	189	150	255	822
D	353	203	166	235	843

The percentage value for the words appearing in dummy A was 52.8, in B 52.3, in C 60.0, in D 60.0. The difference in favor of the words in the last two dummies seems significant.[3]

[3] Probable errors were determined by considering the average value of each word as determined by 100 subjects as the unit. They ranged from 1 to 2.5 per cent of the percentage values. These figures are relatively large, having been determined by only 18 units. If the response of each subject to the 18 different words had been used as a unit, the probable errors might have been smaller, since there were 100 subjects. In the initial treatment of the data, the subjects were divided into 4 groups of 25 each and the results determined separately for each group. Each variant was reduced to a percentage of the sum of all the variants. The values obtained were as follows:

	QUARTER-PAGE			HALF-PAGE			FULL-PAGE		
	1	2	4	1	2	4	1	2	4
F1	8.9	11.6	12.6	9.0	10.2	12.9	9.2	11.5	13.4
F2	8.7	11.6	13.5	8.9	9.8	13.2	8.8	11.2	14.1
M1	9.5	11.4	12.7	9.2	10.2	12.8	9.4	11.0	13.7
M2	9.1	10.9	13.0	9.1	11.1	13.1	9.5	11.0	13.3

Any set of values could have been substituted for any other, for all show the same tendencies. Hence the determination of the probable error seemed to be unnecessary, for it measures only the probable range of a set of averages, and in the above table there is an actual demonstration. Agreement between groups is more significant than a low probable error.

A similar analysis of the words which appeared twice follows. Here there are six possible combinations, AB, AC, AD, BC, BD, and CD. Two words each for the quarter, half and full page situations were used, making a total of six. Table 4 gives the distributions.

When reduced to percentages, the following values are obtained: AB = 60.5; AC = 64.4; AD = 67.0; BC = 70.5; BD = 67.3; CD = 74.1. Here is a range of almost 15 per cent. The same word, appearing in dummies A and B, has the lowest value, while the word appearing in dummies C and D has the highest. Recency is probably a factor in bringing about this result, as is shown by the relatively low values for the A combinations and the relatively high values for the D combinations. Contiguousness of appearance may also be an asset, for the

TABLE 4

	1	2	3	4	5
AB	97	69	49	74	211
AC	104	56	42	63	335
AD	86	62	50	82	320
BC	91	41	46	65	357
BD	92	59	45	76	328
CD	80	42	33	70	375

average for the AB, BC, and CD combinations is 68.4, while in the alternate combinations, AC and BD, the value is 65.8. We are justified in saying that the spacing of the words in the different dummies is a matter of importance.

A further analysis of our results enables us to throw some new light upon the vexing problems of repetition. A word in dummy A and a different word in dummy B (original plus original) will have recognition values of 52.8 plus 52.3, or 105.1. The same word appearing in the two dummies A and B (original plus repetition), has a value of 60.5. The difference is 45.6. If we continue this method for all the possible combinations, the results will be as shown in table 5.

This evidence indicates a loss in learning due to repetition which remains approximately constant at 40 per cent of the value

for the two different words. This "constant" is undoubtedly an index of some sort of inhibition which develops with repetition. This result may be accomplished by retroaction on the first member, or by raising the threshold for the second. Possibly it is related to the decreased interest which is presumed to be the inevitable outcome of repetition. Or perhaps we have hit upon the phenomenon mentioned by Münsterberg,[4] who says, "Quickly succeeding equal or very similar impressions have a tendency to inhibit each other or to fuse with each other." The same general point was also brought out in the writer's article on duplication and variation in advertising,[5] though an exact formulation was not made at the time. Yet these data

TABLE 5

	2 DIFFERENT WORDS	SAME WORD REPEATED	DIFFERENCE	
				per cent
AB	105.1	60.5	45.6	43.3
AC	112.8	64.4	48.4	42.8
AD	112.8	67.0	45.8	40.7
BC	112.3	70.5	41.8	37.2
BD	112.3	67.3	45.0	40.0
CD	120.0	74.1	45.9	38.2
Average difference.....			45.4	40.4

show better than a 35 per cent inhibition as a result of one repetition.

The case is strengthened when we compare the sums of two words, each of which appear twice, as contrasted with the same word appearing four times. For instance, a word appearing in dummies A and B will have a value of 60.5; another word in both C and D will have a value of 74.1. The sum is 134.6. The value of a word appearing 4 times is 81.5. The difference is 53.1 or 39.5 per cent of the larger number. Averaging for the three possible combinations, the percentage is 39.2, almost

[4] Münsterberg, Hugo, Psychology and Industrial Efficiency, p. 202.
[5] Adams, H. F., Journal of Experimental Psychology, vol. 2, p. 453.

exactly the same figure found before. Once again, doubling the number of repetitions introduces an inhibition amounting approximately to 40 per cent.

If now we add together the values of different words appearing in each of the four dummies, the sum is 224.8. Subtracting from this the value of the same word appearing 4 times, 81.5, the remainder is 143.3, or 64 per cent of 224.8. By interpolation, the value for an orginal and two repetitions will be about 57 per cent. The curve showing these relations will tend to approach the horizontal and further repetitions will be useless.

SUMMARY

Under the conditions of this experiment:

1. Women are more certain than men of their judgments.

2. Isolation of a single word upon a page gives it no greater recognition value than is obtained for two or four words to the page.

3. Repetition is effective, but

4. when we contrast originals with an original plus one or more repetitions, we find that repetition has an inhibitive effect, amounting to about 40 per cent for one repetition, 57 per cent for two repetitions, and 64 per cent for three repetitions.

THE COMPENSATORY FUNCTION OF THE MOVIES

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The principle of compensatory activity is a familiar one to the student of psychology. When man's impulses are thwarted, he tries in one way or another to secure a satisfactory adjustment. Indeed, the ability to secure indirect satisfaction is a characteristic human trait. Everyday life abounds with examples of various mechanisms of compensation at work. He who fails in an examination attributes his inadequacy to the unfair nature of the questions, he of reticent and timid nature despises more than anything else aggressiveness or pretentiousness, and he who is physically weak lives with the hero of screen or stage the aggressive life of a robust man. Through projection, one secures satisfaction by attributing his own deficiencies to others, by rationalization one is able to maintain his self-esteem in the face of irrational behavior, identification permits one to substitute for genuine action imaginary achievements by identifying one's self with the conquering or wounded hero. Numerous other types of compensatory adjustment evidence the capacity of the mind to seek out tenaciously satisfying substitute activities.

Individual differences in the ability to withstand the thwarting of wants are great. So too individuals vary tremendously in the types of adjustment affected when thwarting occurs. Some individuals maintain mental calm and poise in the face of the most harassing circumstances and seldom seek satisfaction through substitute gratification; others, however, are actuated by slight deprivations to seek numerous and varied forms of substitute gratification.

The fact of individual differences in reference to the ability to withstand thwarting is at once apparent. The present

writers have observed certain racial differences in frequency of participation in certain play activities which appear to be compensatory in nature. In a recent article appearing in the Psychological Review, the writers displayed data showing that certain Negro children "played school" much more frequently than white children of corresponding chronological ages (1). In this article they suggested that the Negro children played school more often than white children because this activity symbolized to them knowledge, power, and prestige, which they were unable to achieve in the world of actuality.

In another article which appeared recently, the writers presented data showing that Negro children engage in church and Sunday School activities much more commonly than white children (2). It was pointed out that the church affords the Negro many *easily accessible* and intensely satisfying substitute activities. Contact with the white man brings constant and unmistakable signs of inferiority. But religion stressing the doctrine of equality offers the Negro a variety of compensatory interests. The white man too finds solace in religion. However, his participation in religious activities is conspicuously smaller than that of the Negro. It seems likely that routine life with its multitudinous deprivations produces in the Negro a greater need for compensatory devices than in the white man. These data seem to warrant the hypothesis that religion provides the Negro satisfying escape mechanisms, devices by means of which he frees himself from environmental inhibitions and feelings of inferiority.

The reader may feel that the writers have placed undue emphasis upon the concept of "escape." However, it might be said that most human activity is actuated by attempts to escape from unpleasant circumstances. In a recent volume the thesis is presented that the effort to maintain "complacency" characterizes most human behavior (3). In the earlier writings of Freud much emphasis was placed upon what he terms the "pleasure principle" (4). Freud maintained that most human behavior existed in the interest of this desire and that numerous activities not obviously pleasurable actually were symbols

through which gratification of the pleasure principle was secured. Thus Freud maintained that the nightmare exists in reality usually as a symbolic wish-fulfilment. In a more recent article Freud suggests that there may be an additional principle underlying human conduct which goes beyond the pleasure principle (5).

Certainly it is clear that most human activity is actuated by the desire to secure pleasure. The human organism is so equipped that multitudinous responses are possible to every stimulus. The organism seeks constantly satisfying states of affairs, and tries out various modes of response until satisfyingness is attained. All life becomes then a struggle for the attainment of wants and all men manifest this struggle. But the complexity of life today constantly thwarts these wants and many modes of substitute gratification ensue. Certain activities, products of modern invention and ingenuity, afford opportunity for vicarious statisfaction of certain desires which are denied in the world of actuality. Conspicuous among such devices is the moving picture-show which renders substitute gratification in some degree to *most* of man-kind.

The phenomenal development of the movie is a matter of common knowledge. American movie fans spend approximately one billion dollars yearly in admittance fees to 20,233 picture theaters in the United States (6). The extent to which children attend the movies has not been disclosed so far as the writers are aware. The following paper reports (*a*) the extent to which certain groups of children were found to attend the motion picture show, (*b*) the frequency with which picture show attendance was designated by these groups of children as *a favorite activity.*

METHOD

The Lehman Play Quiz was administered in January of 1926 to more than 6000 children in grades III–XII in the public schools of Kansas City, Missouri. The children were asked to indicate among a comprehensive and catholic list of 200 activities *only those* in which they had engaged *during the preceding*

week. The children were later asked to designate the three activities which they liked best. The directions were specific, the teachers were instructed in giving the tests, and the data were assembled from unselected pupils and from unselected

TABLE 1

Number of pupils included in a study of children's play behavior

AGES	WHITE BOYS	WHITE GIRLS	NEGRO BOYS	NEGRO GIRLS	TOTAL
8½	100	100	39	48	287
9½	100	100	75	90	365
10½	100	100	94	123	417
11½	100	100	89	114	403
12½	100	100	104	110	414
13½	100	100	80	91	371
14½	100	100	48	71	319
15½	100	100	40	34	274
16½	100	100			200
					3,150

TABLE 2

Percentages of the children of various age levels who indicated that they had gone to the movies during the course of one week in January, 1926

AGES	WHITE GIRLS	WHITE BOYS	NEGRO BOYS	NEGRO GIRLS	AVERAGE
8½	61	63	74	44	61
9½	74	74	63	73	72
10½	81	79	75	67	75
11½	72	80	81	68	75
12½	69	89	79	74	78
13½	70	81	84	87	81
14½	77	82	83	85	81
15½	76	82	78	88	80
16½	75	78			77

schools in order that the results of the investigation might be reliable. One of the items included in the list was "Going to the movies." It was hoped that salient results could be so obtained from the children in regard to their frequency of movie

attendance and their fondness for this activity. The number of pupils included in the study is indicated in table 1.

RESULTS

Data were assembled separately for white children and for Negro children according to sex. Tables were then prepared

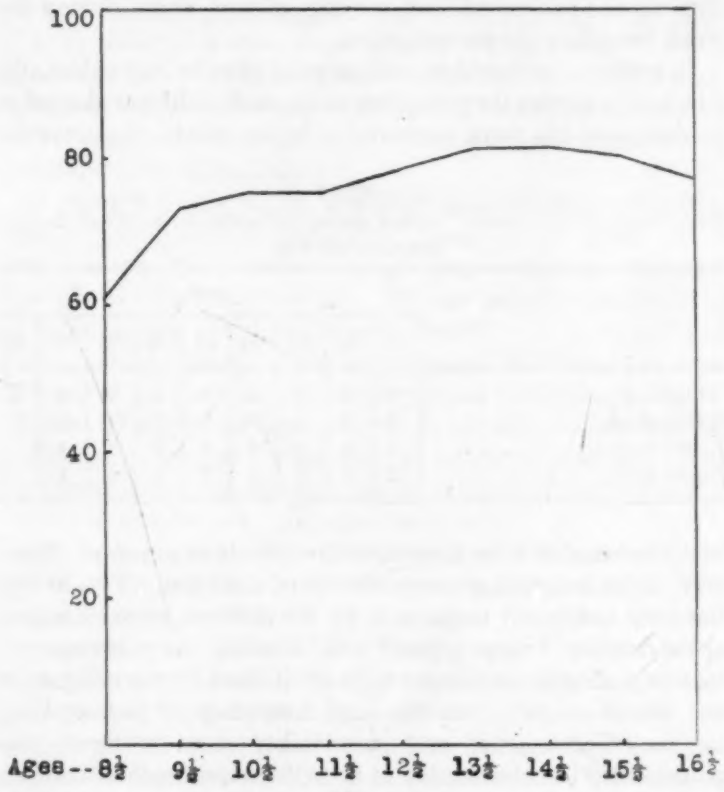

FIG. 1

showing the percentages in each age group who had attended the moving picture show at least once during the course of the week preceding the investigation. Table 2, and fig. 1 present

these data. The data revealed little difference between the sexes in regard to the extent to which they attended the movie. It is interesting further that Negro and white children participated with equal frequency in this activity. The conspicuous and vital fact herein disclosed is that "Going to the movies" is an activity commonly engaged in by school children. Approximately 80 per cent of the children between the ages of 10½ to 15½ attended the moving picture show during the week preceding the investigation.

In addition to checking each activity that he had voluntarily engaged in during the preceding week, each child was also asked to designate his three favorites. On the whole, the activities

TABLE 3

How "Going to the movies" ranked among 200 activities as one of the three favorite activities

	AGES								
	8½	9½	10½	11½	12½	13½	14½	15½	16½
White boys	3	2	1	2	1	1	2	4	4
White girls	4	3	1	1	1	1	1	1	1
Negro boys	5	2	2	2	3	3	1	1	
Negro girls	12	3	1	2	2	1	1	1	

best liked tended to be those most frequently engaged in. However, some interesting exceptions were disclosed. Two activities very commonly engaged in by the children were "Looking at the Sunday 'funny' paper," and "Reading the newspapers." However, these activities are not as well-liked by the children as one would predict from the high frequency of participation therein. Convenience and accessibility seem to figure less prominently in the selection of favorite activities for "Looking at the Sunday 'funny' paper," and "Reading the newspapers," were mentioned only rarely as favorite activities.

Table 3 shows how "Going to the movies," ranked in favor among the 200 activities of the Play Quiz, according to the children's own selection. Table 3 is to be read as follows: "Go-

ing to the movies" is the one activity of the entire list of 200 that was most frequently selected a favorite activity by boys of ages 10½, 12½, and 13½ years. This activity was second in frequency for boys of ages 9½, 11½, and 14½ years, third in frequency for boys of age 8½, and fourth for boys of ages 15½ and 16½.

It will be noted from table 3 that although "Going to the movies" ranks high among the best liked activities of the boys of both races, it is even more popular among the girls. It is significant that "Going to the movies" is slightly less commonly chosen as a favorite among the Negro children than among the white children. Church going activities are conspicuously popular with Negro children.

It was previously stated that individual differences in reference to the ability to withstand thwarting are great. It is true also that the substitute satisfactions sought by thwarted individuals vary tremendously. No one activity was found to be listed among the three favorite activities of every child at any age level. Most of the activities of the Play Quiz were mentioned as favorites by a very small percentage only of children of any given age. About 40 per cent of the children mentioned "Going to the movies" as a favorite activity. It is significant that the nearest approach to unanimity of favor was elicited in response to "Going to the movies."

One logically asks why the movie makes so universal an appeal to the individuals included in the present study. The motion picture depends for its sale upon its appeal to basic human motives. If the public does not respond sufficiently the picture must be shelved. In all art involving large initial cost and expensive presentation, the public largely controls the character of the exhibits. Granting to the film producers the commercial basis on which they must operate, the fact remains that the sweep of their industry has attained such scope as to indicate that the motion pictures are appealing successfully to basic human motives. Other agencies too provide recreation by appealing to human motives. The movie however surpasses all others in popularity. The explanation may be found in the

fact that the movie provides vicarious satisfaction for those fundamental desires which life *most often* inhibits or suppresses. The movie then becomes an escape mechanism, a means by which reality is evaded, and desires fulfilled.

The extent to which one individual may become the symbol through the movies by which thousands obtain vicarious pleasure is expressed by the following:

> Valentino had become that priceless thing—a symbol. It was not so much a motion-picture actor who lay dead as Pan or Apollo whom they are going to bury from Campbell's funeral parlor. He was to the thousands the romance which they never knew. He was Prince Charming and came from the other side of the moon. For those who have no access to music Valentino was the violins of "Tannhäuser." And many who have never read Shelley had seen "The Shiek" (7).

The above paragraph explains not only the success of one movie idol but the success of the motion picture industry itself. Routine life brings many deprivations to all; the movie provides numerous forms of substitute gratification, definite pleasurable escapes from reality.

The popularity of the movie with children arises from the same source. Life is a constant inhibitor to the active nature of the child; compensation is demanded and secured through many make-believe activities.

> The child is driven by many inherited and acquired impulses, some of which are adequately and easily expressed, and some of which find no direct outlet. These latter create a situation demanding compensation, and this compensation is as a rule secured through make-believe activities. Most common among such activities are play and fantasy. A child would fight, hunt, and make a home as particular stimuli arouse him. He is seldom in such an environment, however, and he is practically never so organized by inheritance or training that these undertakings can be fully carried out. There are inexhaustible inhibitors around him and within him which check free expression. And so he plays at, or has day-dreams of, fighting, hunting, and home-making. I have no desire at this time to say which of the unsatisfied impulses of childhood are inherited and which acquired; but, however they arise, we find that they are many and urgent, and consequently that every normal child must find compensation for their inhibition (8).

The writers feel that the movie provides for the child his most satisfying escape mechanism. The frequency with which he turns to this activity and its popularity give evidence of its strength as a mechanism of substitute gratification. It is at once apparent that too frequent movie attendance may yield undesirable results in the life of the growing child. It is not the purpose of the writers to estimate the effects of movie attendance upon the child. They have sought merely to emphasize the rôle of the movies as a substitute mechanism through which escape from reality is permitted and satisfaction achieved vicariously.

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SOCIAL STATUS OF THE CLERICAL WORKER AND HIS PERMANENCE ON THE JOB

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In a recent number of the JOURNAL OF APPLIED PSYCHOLOGY, Bills reports a study of the relationship between the social status of the clerical worker and his permanence on the job.[1] The measure of social status which she used was the position of the father in the following occupational hierarchy:

	PER CENT LEAVING BEFORE SECOND YEAR
I. Unskilled laborer	25
II. Semi-skilled mechanical worker	33
III. Skilled mechanical worker	33
IV. Clerical worker	40
V. Salesman or manager of a department in a company	50
VI. Proprietor of a small business	62
VII. Professional man (including managers or owners of large business concerns)	57

On the basis of this classification a tabulation was made of the occupations of the fathers of 59 clerical workers in a life insurance company of medium size who were hired during the year 1922. At the end of 1924 an examination was made to see how many of each class had remained with the company through the second anniversary of the date of employment.

The per cent of persons in each group who had left before two years is indicated above. The number appears to be small

[1] M. A. Bills. Social status of the clerical worker and his permanence on the job. Journal of Applied Psychology, 1925, vol. ix, 424–427.

in the unskilled group, increasing gradually to a high peak in group VI. This leads Bills to advance several interesting hypotheses:

If, by taking a clerical position, the worker betters his occupational status, that is, holds a position higher in the scale

TABLE 1

Occupations of fathers of 127 clerical workers hired in 1923

	NUMBER OF CLERKS REMAINING FOR TWO YEARS OR MORE			NUMBER OF CLERKS REMAINING LESS THAN TWO YEARS			PER CENT OF CLASS REMAINING LESS THAN TWO YEARS		
	Men	Women	Total	Men	Women	Total	Men	Women	Total
I. Unskilled laborer				1	3	4	100	100	100
II. Semi-skilled mechanical worker	5	5	10	6	5	11	55	50	52
III. Skilled mechanical worker	7	3	10	18	7	25	72	70	71
IV. Clerical worker	2	1	3	11	2	13	85	66	81
V. Salesman and department manager	9	1	10	15	2	17	62	66	63
VI. Proprietor of small business		2	2	7		7	100	0	78
VII. Professional man (This group would include managers or owners of large business concerns but there were none in the 127 cases studied)	5		5	7	3	10	58	100	67
Total	28	12	40	65	22	87	70	65	69

than that occupied by his father, he will continue in it; but, if the clerical job means a demotion in his social status, he tends to leave the job.

As a second explanation, she suggests that the point of view regarding prospects for promotion in clerical work varies ac-

cording to the occupation of the father. The son of a mechanical worker sees in clerical work a field of desirable opportunities, but the son of a salesman or of a proprietor does not consider such prospects as being very bright.

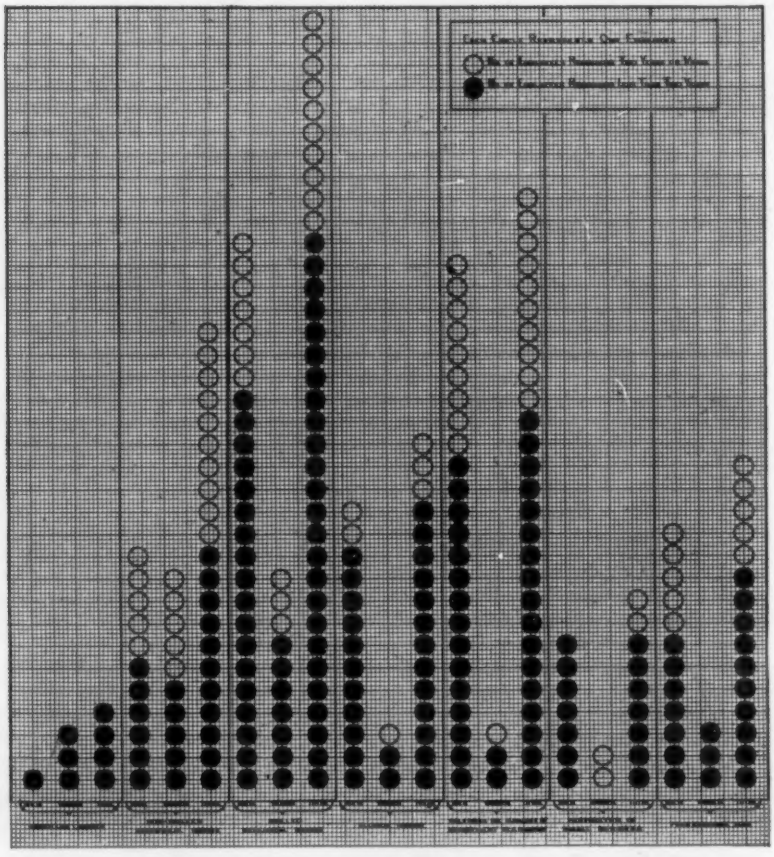

FIG. 1

This investigation of Bills stimulated the writer to make a similar study among 211 clerical workers who were hired in a large financial organization in New York City during the year

1923.[2] Attempt was made to follow the same method used by her and, in addition, to separate the data on the basis of the sex of the worker.

Unlike Bills, the writer experienced considerable difficulty in classifying many of the parental occupations reported. For example, one employee reported only "railroad employee" and another reported only "Western Union Telegraph Company." Difficulty was also presented by such cases as: "retired farmer," "sergeant of police," "driver," and "ex-fireman." Such cases were eliminated from consideration, leaving 127 as the basis of investigation.

At the end of 1925 an investigation was made to determine how many of these 127 who were hired during 1923 had left the establishment before completing two years of service. Results are presented in table 1 and figure 1.

There are several sources of error that should be mentioned. One is the difficulty, already noted, in classifying many occupations. Another is the small number of cases involved; although this investigation covers almost twice as many cases as that of Bills, the number in each of the seven occupational classes is quite small. Other errors might have arisen from misstatements made by employees concerning their fathers' occupations. It would seem, however, that similar sources might have accompanied Bills' study.

CONCLUSIONS

1. In the company investigated by the writer there apparently exists little relationship between social status and permanence on the job. If we combine the data of groups I, II, and III (the mechanical occupations) and compare the combination with group IV (clerical) and with a combination of the data of groups V, VI, and VII (the sales, executive, and professional groups), we find that the first combination

[2] The guidance of Prof. H. D. Kitson, Teachers College, Columbia University and the assistance of Miss E. M. Paulitsch are gratefully acknowledged.

indicates a percentage of 66 remaining less than two years, group IV, 81 per cent, and the combination of groups V, VI, and VII, 66 per cent, that is, equal numbers at the extremes of the social scale. This comparison and table 1 indicate that Bills' hypotheses do not hold good for this company.

2. There is apparently little, if any, difference in turnover because of sex, the per cent of women remaining less than two years being even less than the per cent of men. This condition is similar to that reported by the writer in connection with another investigation which showed that, contrary to popular belief, women are practically as permanent on a job as men are.[3]

[3] H. B. Bergen. Stability of men and women office workers. Journal of Personnel Research, 1926, vol. v, 71–73.

SOME FACTORS INFLUENCING THE SELECTION OF BOYS' CHUMS

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What motives guide a boy in the choice of his friends? This question has a theoretical interest for the social psychologist, as well as a practical interest for the educator, the recreational leader, and the juvenile court worker. It has attracted the attention of several investigators. Almack[1] obtained from 387 school children, grades four to seven, the names of their chums. All were given the National Intelligence Test and then the agreement between chums was studied by the technique of correlation. The correlations between the chronological ages of the children and the chronological ages of their chums averaged 0.48. For mental age the corresponding coefficient was 0.53, and for IQ it was 0.34. Warner[2] studied 66 delinquent boys and found that in pairs of chums and in gangs similarity of mental age had a large influence. The statistical analysis of the data is not carried far. Williams[3] found that 84 adolescent boys in a school for delinquents tended to choose friends of the same mental and chronological age. The data are not treated statistically.

The present study attempts to estimate the influence of seven factors in the choice of companions by pre-adolescent boys. The factors are (1) grade location, (2) neighborhood, (3) chronological age, (4) mental age as measured by the Hag-

[1] Almack, John C.: The influences of intelligence on the selection of associates. School and Society, 16: 529–30, November 4, 1922.

[2] Warner, M. Lavinia: Influence of mental level in the formation of boys' gangs. Jour. Applied Psychol., 7: 224–36, September, 1923.

[3] Williams, Paul E.: A study of adolescent friendships. Pedagogical Seminary, 30: 342–46, December, 1923.

gerty Delta-2, (5) developmental age or social maturity according to a rating scale devised by the author and elsewhere described,[4] (6) height, and (7) weight.

The subjects were taken from an experimental group with whom some intensive recreational work is being carried out under the direction of the Department of Sociology of the Catholic University of America. All the boys were asked to write down the names of the boys they liked to play with. It was intimated that the data furnished might be used later in the formation of Scout patrols. Among the boys for whom the data enumerated above were complete, there were 296 names of chums submitted. To secure greater reliability only "mutual" pairs of chums were studied, that is, only those pairs

TABLE 1

Means and standard deviations of the experimental group

	CHRONOLOGICAL AGE	MENTAL AGE HAGGERTY SCORE	HEIGHT	WEIGHT
	months		*inches*	*pounds*
Mean	156.8	115.5	58.9	88.2
Standard Deviation	9.9	17.9	3.0	17.2

in which each of the two had mentioned the other as one of his chums. This reduces the group to 62 pairs comprising 35 different individuals. Table 1 shows the means and standard deviations of the group. Since the same individuals appeared among the 62 pairs as often as ten times or as seldom as one, each individual's score is weighted by the number of times he appears.

The first striking feature to be noticed was the fact that nearly all the boys were either in the same class in school or lived in the same neighborhood. Twenty-eight, or 45 per cent, of the

[4] See articles by the present writer: An improved rating scale technique. Jour. Educational Psychol., 17: 45–48, January 1926; Some preliminary results on the nature of developmental age. School and Society, 23: 183–4, February 6, 1926.

62 pairs were composed of boys living in the same neighborhood; 55, or 89 per cent, were composed of boys in the same room at school. Only one of the 62 pairs was made up of two boys who were neither in the same room in school nor the same neighborhood, and in this case the boys had been in the same room the previous year. It seems as if association, either in school or in the neighborhood, is a condition *sine qua non* in the formation of boys' gangs. Adults will go a long distance to seek congenial spirits; but boys must find them already in their environment.

But granted that environment is a necessary condition, there must be other elements in the selection of chums. A boy does not select *all* the other lads in his class or neighborhood as his particular chums. Other selective factors are at work.

TABLE 2

Correlation of chums with each other with respect to certain variables (raw coefficients)

Chronological age	0.39±0.07
Mental age	0.24±0.08
Developmental age	0.37±0.07
Height	0.34±0.08
Weight	0.22±0.08

What are these? In an effort to answer this question the writer calculated the correlations between chums in respect to five qualities with the results which are reported in table 2. The coefficients were calculated by the formula

$$r = \frac{4N\Sigma XY - (\Sigma X + \Sigma Y)^2}{2N(\Sigma X^2 + \Sigma Y^2) - (\Sigma X + \Sigma Y)^2}$$

which, for cases like the present, is equivalent to the usual product-moment formula and which should be used in order to avoid spuriously high correlations, as is shown elsewhere.[5] In order to eliminate the effect of attenuation, the reliability of the Haggerty Delta-2 was calculated by the method of split

[5] Furfey, Paul Hanly: Formula for correlating interchangeable variables. Jour. Educational Psychol., 18: 122–24, February, 1927.

halves and found to be 0.91. The reliability of the rating scale for developmental age was found from other data to be 0.90. Correction for attenuation, then, raises the coefficient of correlation between mental ages of chums from 0.24 to 0.26 and the coefficient for developmental age from 0.37 to 0.41.

Taken at their face value these figures would seem to indicate that a boy is most influenced in his choice of friends by developmental age, or maturity, and chronological age, and least by height and mental age. Such a conclusion can scarcely be justified, however, as the differences between the coefficients in no case reach three times their probable errors and a difference ought to be at least four times the probable error to be significant. We are forced to conclude, therefore, that the differences between the correlations are not significant and that the correlations themselves only indicate with considerable certainty that there is a tendency for boys to choose chums of the same size, age, intelligence and maturity as themselves.

The comparatively low correlations obtained by others as well as by the writer indicate that there are many, as yet unmeasured, factors in the formation of boys' friendships. The influence of common moral standards, of common tastes, of common temperaments have never been studied quantitatively. We must await the development of further tests for non-intellectual traits before the whole question can be solved. In this connection it is perhaps suggestive that the highest of the correlations here reported is the corrected coefficient of 0.41 for developmental age, or social maturity, which is itself a non-intellectual trait.

SUMMARY

1. Association, either at school or in the home neighborhood, seems to be an essential condition for the formation of boys' friendships.

2. Within the same school, or neighborhood group, boys tend to choose chums of the same age, size, intelligence, and maturity. The closeness of the agreement between chums is

represented by correlation coefficients which average about 0.31. There is no significant difference between the influence of these various factors.

3. The low correlations obtained by the writer and others suggest that the more important factors are certain non-intellectual traits as yet unmeasured. In this connection the corrected correlation of 0.41 between the developmental ages of chums—a non-intellectual trait—is interesting.

OBSERVATIONS ON A VISUALLY PREOCCUPIED CHILD

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The following notes on the psychology of a four-year-old boy, Jack, are reported because of their interest from three different angles, (1) a rapid rise in I.Q. due to stimulating the child; (2) the presence of what appeared to be what is now called "eidetic imagery;" and (3) concurrent with such imagery as cause or effect, a preoccupation with visual details accompanied by extraordinary proficiency in certain performance tests.

The first intelligence test was given the child in September 1918, at the chronological age of 3–8, when an I.Q. of 100 was made. Subsequently the following I.Q.'s were obtained.

January 1, 1919	125
March 1, 1919	135
June 28, 1919	130
September 13, 1919	135

The increase in the I.Q. was undoubtedly due, in part, to the fact that an effort was made to stimulate the child's activities; in part, to satisfactory adjustment to a new environment.

From the first it was evident that Jack possessed an extraordinary interest in visual form. This had been previously noted in him at the age of 18 months. In his first test (September, 1918) he not only handled the discrimination of forms in year IV–2 with great ease but when, through some error, I forgot to ask for the identification of the tenth figure, he placed his finger on this form and asked why I had failed to present the copy of it.

This interest in visual form appeared also in the results that I got in teaching him to recognize words. After two or three lessons he broke them up of his own accord into letters which he found most interesting. "T" he named the "airplane" letter, and "L" the "gun" letter. His preoccupation with letter forms during this period was very amusing. Every trip down town resulted in an excited hunt for letters on billboards, shop-signs, etc. He also devised a plan for eating his toast into letters, and making shadow letters which amused him greatly. His interest in the form of the letter and of a word was in contrast to that of a small girl cousin (D) six months older (I.Q. 137), who shared his lessons with him. Her interest was in the meaning of the word rather than in its visual form. Consequently when I asked to have words arranged so as to tell a story, D. did this with great alacrity, but Jack was interested merely in the visual combinations. The same difference was found when the children began reading in the primer. D. read for the sense, remembered the words once read and repeated them glibly; Jack recognized words without reference to their connection. It was some time before he got the idea of reading a story. D. frequently substituted words of similar meaning and guessed freely when she didn't know. Jack rarely guessed, but what he knew, he knew.

His memory for visual form was extraordinary. In shifting from capital to small letters I explained to him the two forms of the letters and showed him a page in the primer where capital and small letters were arranged in parallel rows. He got the idea at once and then very deliberately ran his finger down the two rows and learned the small letters from one observation. It was almost as though a photographic process occurred.

Another illustration of his preoccupation with visual detail occurred the first time the word "too" was seen. He objected at once to the two o's. After I explained to him that "to" and "too" are different words, he had no difficulty in keeping them separate.

I believe that certain of his reactions point definitely to the possession of eidetic imagery. No attempt was made to teach

him to spell, but one day in January, shortly after his fourth birthday Jack announced suddenly that today he could spell, and then very deliberately, with a fixation of the eyes as though he were reading from his book, he spelled aloud twenty different words. Apparently this ability fluctuated. There were days when he visualized words with great clearness and insisted upon spelling them aloud. Other days he was unable to do this.

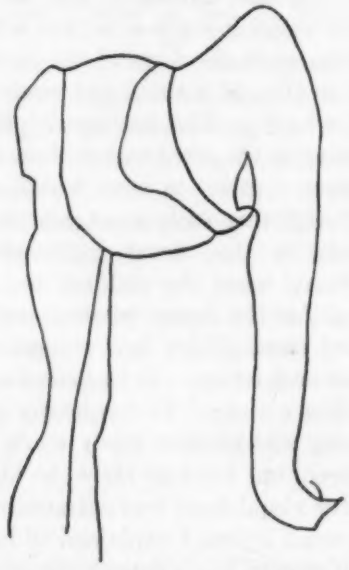

FIG. 1. DRAWN BY JACK, MARCH 6, 1919; AGE 4 YEARS 2 MONTHS

In this connection, I give a drawing of an elephant which he produced spontaneously at the age of 4–2 (fig. 1). In comparison with the drawings of other children of equal age it is an interesting production. When I asked him why he drew the animal only in part, he answered that sometimes you could see it only in part. Whether this drawing was motivated by a visual memory of an elephant which he had seen some months before in a circus or was a copy of a picture in one of his books, I do not know. An interesting thing is the fact that this draw-

ing was a unique performance although I believe that the child might have been stimulated to draw.

The special ability to which I referred in the opening paragraph is that of skill in handling picture puzzles and similar performance tests. Three dissected pictures were given Jack at Christmas time when he was exactly four years of age. He developed such a passion for them that others were procured. In all, he came into possession of fifteen different puzzles. One was a dissected map of the United States, which he insisted upon having after hearing us remark that he was too young to enjoy it. He had no difficulty in putting it together and took great pleasure in pointing out different states, such as California, his home State. He learned to locate a number of cities on it.

Two other of the puzzles were complicated jig-saw puzzles. An uncle who needed thirty minutes to put the simplest of these together was confident that Jack would be unable to handle it successfully. This proved a mistaken notion. The two jig-saw puzzles giving, the one, a picture of a bear and, the other, of a fox, proved to be the most fascinating of the fifteen both to him and to his little brother of two and a half years. Jack developed a facility in putting them together that was startling to a visually unobservant person like myself. The background of cloudy blue furnished me no clues for the placing of the marginal blocks, but Jack discriminated every piece from every other one and placed each instantly in its right place with no need of a trial and error dove-tailing.

In March, 1919, I gave Jack, then 4 years and 3 months old, the Pintner-Patterson performance test. He made a mental age of 6.9 years by the year scale. His greatest success was with the ship test which he put together without an error in three minutes, a 13-year performance. There was evident a matching of blocks on the basis of delicate visual details to which I would have been quite oblivious. He was also delighted with the ship as a whole for at that time he studied carefully every ship he found pictured since he associated ships with his father who was then in France.

He failed to complete in the time limit the five-figure board, and two-figure board and the feature-profile test, and it took him 9 minutes 30 seconds for the Healy Puzzle "A." He was so distressed at failing to get the five-figure board and the two figure board that I thought it well to show him the moves. In the picture-completion test he made only a four year old record. He seemed content to choose the blocks by ease of fit and intrinsic interest in the picture on the block without reference to the relationship to a second picture.

As he insisted upon repeating the Healy puzzle "A," after once completing it, I took his record as follows:

First trial	9 minutes 30 seconds	57 moves
Second trial	35 seconds	7 moves
Third trial	35 seconds	7 moves
Fourth trial	12 seconds	5 moves
Fifth trial	excessively fast; did not get exact time	5 moves
Sixth trial	10 seconds	5 moves

In getting a percentile comparison it was necessary to use the norms for 5 years. Jack made the 100 percentile record for mare and foal, better than 100 percentile for the ship test, 90 percentile for the Seguin form board, between 90 and 100 for the diagonal test, etc.

Six months later the Pintner-Paterson test was repeated. Jack, now 4–9, made the record on the Year Scale of a child of 9 years. Undoubtedly the effect of the practice in the first trial held over. He did the ship test in 1 minute 53 seconds. He explained that in the Seguin board the holes were larger than the blocks, which they were a trifle, and this made him think at first that they did not fit. He again failed on the picture-completion test since he was more interested in the perfect fit of the blocks than in the meaning. In the cube test he got 8 lines, a 15 year old record. He was in excellent physical condition at the time of this test and showed to a high degree the high concentration of attention which is so characteristic of him under the best conditions.

That Jack's power of analysis is not limited to the visual

field was shown by the fact that in March, when I brought to a close my lessons with him, he was beginning of his own accord to analyze out the phonetic values of the different letters.

There were many evidences that conditioned responses were formed by Jack on the basis of delicate visual discrimination of detail. Some times the family were unable to determine just what the stimulus was in a particular reaction. For instance, he refused to eat except from a certain spoon that he called the "blue spoon." He was always able to select the spoon from a number of similar design with great rapidity but his grown-up relatives were never able to select it for him. Responses, once conditioned, were difficult to break up. Other adjustments were made only after considerable practice. Jack was not motorly venturesome, although precise and accurate in his movements, and it needed considerable stimulation from other children to interest him in any sort of gymnastic stunt.

ESTIMATES OF AMOUNT OF WORK ONE CAN DO

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Given a brief opportunity to examine the work, persons were asked to estimate how much they could do in a given (three-minute demonstrated) period of time. Estimates were later checked against actual performance. Information sought in this study relates principally to conditions of correctness in estimates and constancy of over- or under-estimation in varying situations.

Six different "Exercises in Estimating" (as they were labeled) were presented in paper form to 561 school children in grades ranging from fourth to ninth, and to 154 college sophomores. Two additional laboratory tasks were estimated by 48 of the 154 sophmores.

DESCRIPTION OF TASKS AND PROCEDURE

Preliminary exercise: "for the sole purpose of helping you to form an opinion regarding the length of a three-minute period." Alphabet was written backwards repeatedly during three minutes.

Task 1: How many makes of automobiles can you name (write down) in three minutes?

Task 2: How many of the capitals of the states in the Union can you name in three minutes when the names of the states are given and you are to write the names of their capitals?

Task 3: How many different magazines can you name (write down) in three minutes?

Task 4: wib fid nub vek dax vup geb jek mib zer ber fal wuf pib gix How many of these sixteen nonsense syllables will you recognize ten minutes from now when they are shown scattered among forty others much like them?

Task 5: Forty fractions shown. How many will you be able to express in per cents if given three minutes in which to work?

Task 6: Forty columns of figures shown. How many can you add correctly in three minutes?

Note: Complete verbal instructions accompanied presentation of the task. All questions were answered before beginning.

Laboratory task, Dart Throwing: Target shown, distant 14 feet, mode of scoring explained, 15 darts shown. What score can you make, throwing these fifteen darts?

Laboratory task, Ball Throwing: Basket shown, diameter 6½ inches, distance 9 feet. Fifteen golf balls shown. How many can you throw into the basket?

RESULTS

A. Relation between correctness of estimate and actual ability. (See tables 1, 2, 3)

Table 1 shows rankings of the various groups of graded school children, according to ability (1st rank to highest average performance) and according to correctness of estimate (1st rank to most correct, smallest Av. Error). The six different tasks are indicated by their respective numbers across the top of the table, over the double columns of rank.

The emphatic and fairly consistent inverse relation apparent in the case of the 4th Grade group suggests ease of estimation in the face of tasks too difficult rather than any particular relation between performing-capacity and estimating-capacity that might be inferred from coefficients of correlation determined from these ranks. Nevertheless, the case of Grades 8 A and B, showing almost as emphatic inverse relation at the other end of the scale, is not so easily accounted for in terms of inevitable ease or difficulty of estimation. The Rank Difference coefficients of correlation are shown but with this reminder, that they represent relationships among 13 groups, not among the 561 individuals.

Table 2 reveals Pearson Product-Moment coefficients of correlation between actual performance and correctness of estimates in the study of 154 college sophomores. The distortions produced by the grouping of data reported in table 1 are here avoided.

The difference between the picture of relationship presented

here and that presented in table 1 is partly explained by the greater homogeneity of this group.

M.V. of Performance of 154 college sophomores

Task	1	2	3	4	5	6
	4.86	4.47	4.29	2.00	3.55	6.03

M.V. of Averages of Performance of Groups of table 1

12.7	6.3	9.7	9.5	12.5	13.8

TABLE 1

Ranks of Separate Groups according to Performance (Per.), and according to Accuracy of Estimate (Est.)

NUMBER	GROUP	TASK 1		TASK 2		TASK 3		TASK 4		TASK 5		TASK 6	
		Per.	Est.	Per.	Est.	Per.	Est.	Per.	Est.	Per.	Est.	Per.	Est.
90	9A	2	10	7	12	4	4	4	6	4½	7½	5	8
45	9A & B	4	11	8	7½	5	7	2	4½	2	4	3	12
18	Nurses	3	3	2	6	2	11	10½	4½	3	11	2	11
24	8 A	12	5	10	11	11	3	8½	1	4½	9	1	9
40	8A & B	*1*	*13*	1	10	3	7	3	3	*1*	*12*	6	10
43	8 B	8	7	4½	3	*1*	*13*	*1*	*13*	7	7½	7	6
36	7 A	10	2	9	9	6	7	5	8	8	3	12	4
42	7 B_1	6	8	6	4	9	5	12	11	11	2	*13*	*2*
72	7 B_2	5	9	11	13	7	9	10½	2	6	5	4	13
40	6 A	7	6	4½	5	8	10	6	9	9	1	11	1
32	6 B_1	9	12	3	7½	10	12	7	10	10	6	9	3
39	6 B_2	11	4	*12*	*2*	*12*	*1*	8½	12	12	10	10	7
40	4A & B	*13*	*1*	*13*	*1*	*13*	*2*	13	7			8	5
	r =		(−0.63)		(−0.09)		(−0.51)		(−0.09)		(−0.43)		(−0 84)

Possibly the one factor (very low performance ability) which was operative in producing the inverse relationship between correctness of estimate and performance among the groups of table 1 was not present in the college group.

Table 3 (line 1) shows Spearman Rank Difference coefficients between actual performance and correctness of estimates in the study of 48 college students, with the two laboratory tasks. Correlations between correctness of estimates and Thorndike Intelligence scores are added.

TABLE 2

Relation between correctness of estimate and performance. 154 cases

TASK 1	TASK 2	TASK 3	TASK 4	TASK 5	TASK 6
0.32	0.14	0.24	0.51	−0.10	0.13

TABLE 3

NUMBER OF CASES		TASK	
		Dart throwing	Ball throwing
48	Correctness with Performance	−0.14	0.05
42	Correctness with Intelligence	0.20	−0.21

TABLE 4

Direction of estimates

Plus signs represent over-estimation; minus signs represent under-estimation.

GROUP	TASK 1	TASK 2	TASK 3	TASK 4	TASK 5	TASK 6
College	−3.35	7.98	−1.60	−3.72	3.45	−0.04
9 A	2.12	9.98	−0.25	−2.03	1.85	0.18
9 A & B	−0.91	8.75	0.44	−2.70	0.33	0.16
Nurses	−1.50	5.70	−0.40	−2.80	1.10	−5.00
8 A	1.66	8.83	−0 29	−1.79	0.42	−3.00
8 A & B	7.12	7.15	−0.90	−1.32	2.90	2.90
8 B	1.25	3.37	−0.14	−4.07	0.67	−2.18
7 A	1.19	9.03	−0.61	−2.34	−1.11	1.03
7 B_1	−0.07	4.07	0.47	2.12	−0.33	0.62
7 B_2	2.00	10.86	0.21	−1.55	0.98	−2.83
6 A	−0.42	5.80	−0.50	−2.47	−1.45	−2.05
6 B_1	4.26	7.29	2.87	0.00	2.68	1.59
6 B_2	−1.80	3.60	0.17	−2.20	4.90	0.45
4 A & B	−0.37	0.46	1.00	−2.74		1.36

Forty-eight College Students: Two Laboratory Tasks: Dart Throwing, 7.71; Ball Throwing, 3.08.

B. Factors related to the direction of estimates, i.e., whether over- or under-estimations (see following tables 4 and 5)

Table 4 shows the constant errors of estimate—Av. Error regarding signs—in the case of the 154 college sophomores as well as the graded groups of 561 school children.

No influence upon direction of estimates by such factors as Age or Grade can be detected. There is no grouping of signs or gradation of amounts of error according to grade levels. The nature of the error of each group is determined by factors specific within that group.

No one of the groups shows distinctive tendencies of over- or under-estimation, unless it be group 6 B_1, persistently positive. (One cannot with justice, when dealing with either groups or individuals, combine records of this kind into a single score to enable easy rating. A case of high over-estimation in many situations with a few low under-estimations gives a very different picture from the case of constant moderately high over-estimation which would yield a combined score indistinguishable from the other.) This persistently positive group 6 B_1 is a heterogeneous group, like the other groups, with respect to race and sex. Variability within the group is not different from that discovered within the other groups. The teacher reports no special mode of instruction nor other peculiar influencing factors.

The influence of the situation in determining the direction of the estimates is apparent in the case of tasks 2 (naming capitals) and 4 (recognition of nonsense syllables). All groups without an exception yielded to the enticing appeal of task 2, and over-estimated. Deception played no small part in this case, for few individuals evidently realized that backward association was called for here. It is the task of naming states when their capitals are given which we can all do fairly well, and not this task of naming the capitals. For some reason under-estimation prevailed, with the exception of one group, in the consideration of task 4. Distrust of the unfamiliar seems evident. Dart and Ball throwing, the laboratory tasks which were

presented several weeks after the encounter with the paper tasks, called out almost unanimous over-estimation from the 48 college students. Evidently these tasks are "not as easy as they appear."

Table 5 reports average constant errors of all girls (332) taken as a group and all boys (365) taken as a group, separately.

TABLE 5
Sex Differences

	TASK 1		TASK 2		TASK 3	
	Girls	Boys	Girls	Boys	Girls	Boys
Av. Constant Error	0.35	0.27	7.30	7.34	−0.33	−0.11
M.V. dis	4.14	5.33	7.12	3.49	3.49	3.86
	TASK 4		TASK 5		TASK 6	
Av. Constant Error	−2.28	−2.21	1.64	2.01	0.11	−0.47
M.V. dis	2.92	2.73	4.94	4.99	5.65	5.19

TABLE 6
Direction of estimates of good and poor performers

	TASK 1	TASK 2	TASK 3	TASK 4	TASK 5	TASK 6
Good performers:						
Av. Constant Error	1.39	1.63	1.53	1.20	−0.42	1.71
M.V. dis	3.63	6.65	3.83	2.33	3.10	3.91
Poor performers:						
Av. Constant Error	−1.81	−0.94	−1.03	−1.79	1.25	−1.06
M.V. dis	2.60	5.53	2.98	1.24	4.84	2.82

The scores of 18 girls, the nurses' training school group, are not included in this comparison because test conditions as well as training influences in their case lacked the element of presence of opposite sex common to all others included. There is very clearly no appreciable sex difference in the responses to these situations.

Table 6 reports the direction of error of two groups divided

according to performance ability, on the one hand those comprising the upper quartile in the distribution according to performance of the 154 college sophomores, and on the other hand those comprising the lower quartile. The information sought is, whether good and poor performers are distinguishable in the direction of their estimates. Does the one group tend to over-estimate and the other to under-estimate amount of work that they can do? These differences are significant, and constant enough from one task to another to indicate a true tendency. The exception in case of task 5 (converting fractions to percentages) may be due to irregularities of time-estimation involved in this experiment. Both tasks 5 and 6 suffer from lack of control of this time factor. It should be noted, from the character of the tasks and the particular time period chosen (3 minutes), that this truly serious objection does not apply in the case of the other tasks. Time estimation is not at all involved in the case of the two laboratory tasks, nor in task 4, and it plays little part in estimation of tasks 1, 2, and 3. In other words the setting of a three minute limit in the case of these last named tasks operates merely as a warning that performance will need to be hurried—that much time will not be allowed for thinking.

If choosing more work than one can do may be regarded as indicative of something related to Confidence, or if this form of over-estimation is related to over-estimations in self-evaluation, then these results should probably be compared with certain other results that have been reported. Comparison is forced, no doubt, but should be made in the interest of the further questions which it provokes. Allport and Allport[1] found "a striking tendency for those who are high in intelligence to have a negative index, that is, to under-estimate themselves, and for those who are low in intelligence, to have a high index." That tendency is the reverse of what was found characteristic of the kinds of estimations made by the subjects in this experiment. Trow[2] also reports results which offer no confirmation

[1] Allport and Allport: Jour. Abnormal and Social Psychol., 1921–1922; vol. 16, pp. 20–21.

[2] Trow: The psychology of confidence. Arch. Psychol., no. 67.

of the tendency observed in this experiment. Correlations between Achievement and Confidence scores in Trow's study were low and mostly negative, giving a total r of -0.03. "The people who tend to be more confident than others are as likely to be right as the unconfident; and the unconfident are as likely to be right as the confident."

C. Constancy of over- or under-estimation in varying situations (see table 7)

Relatively high, low, or medium degrees of over- or under-estimation are in consideration here, rather than just the direction of estimates. Mere direction of error is largely a function of the situation and was considered in connection with table 4. Consideration of relative degrees of high or low estimation may be expected to reveal factors which are more closely a function of the individual.

Quartile classification of individuals was made, giving three groups, high, low, and medium, according to highness of estimation relative to other members of their own respective groups in estimation of the six different tasks separately. No combining of groups (even of the two 7 B groups, for instance) was regarded as permissible in the determination of these classifications. Each student is thus given a rating through comparison with only those whose estimations were made under the same conditions of environment, and whose training influences at the time (class work and teacher) were the same.

Constancy in varying situations can now be expressed in terms of a classification based upon the positions maintained in the six different classifications. Definition of the classes high, low and medium in this final classification is arbitrary, and is therefore made as liberal as good judgment seems to allow. In the high group, in this final classification, are included all those who maintained a high ranking, i.e., were in the upper quartile in all six, five, four, or three of the situations and did not appear low, i.e. in the lower quartile in any situation. In the low group are included those in a converse position, low

in three or more situations and high in none. The medium group are those neither high nor low in any situation.

Table 7 reveals the per cents of the total groups who fall into these final classes. Per cents fitting a somewhat similar classification in the writer's previous study of Speed of Decision are added to the table for purposes of comparison. Though the number of situations is the same in both studies, the classifications are not strictly comparable because the definition of classes has been a bit more liberal in this study of estimates.

TABLE 7

GROUP	HIGH	LOW	MEDIUM	TOTAL PER CENT OF GROUP CLASSIFIABLE
	per cent	*per cent*	*per cent*	*per cent*
561 school children	13	13	3	29
154 college sophomores	12	10	3	25
142 college students—Speed of Decision	10	13	8	31

Hence the smaller figures obtained in this study constitute a true difference in that direction from the figures obtained in the previous study.[3]

CONCLUSIONS

1. No clearly demonstrable relationship exists between correctness of estimates and performance. However, when performance of school grade groups is compared with their respective estimates rather pronounced negative relationship appears, indicating that the lower grades (mostly), poor in performance, estimate on the whole more correctly, and conversely.

2. Thorndike Intelligence scores correlate in unimpressive and conflicting manner with correctness of estimates of two laboratory tasks.

[3] Jour. Applied Psychol., December, 1921, vol. V.

3. Direction of estimates, i.e., whether over- or under-estimation, is largely determined by the nature of the task estimated, and is not noticeably influenced by any such factors as Age, Grade, or Sex.

4. Under the circumstances of these estimations and performances, the good performers show a tendency to over-estimate, and the poor performers tend to under-estimate.

5. Little constancy of any one form of reaction in varying situations is manifested, making classification of individuals as over-estimators or under-estimators difficult.

CLINICAL VALUES OF THE RHODE ISLAND INTELLIGENCE TEST AND THE TOWN PICTURE GAME

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In the examination of children below mental age 7 years, clinical psychologists have found themselves handicapped by the lack of other than language tests. The Rhode Island Intelligence Test and the Town Picture Game cannot properly be called non-language scales since understanding of language is essential to the response. However, since language expression is not required in the response and since the language used in giving the tests is, on the whole, reduced to the simplest terms, they offer an approach to the measurement of young children and especially of those who have language handicaps or who are slow to express themselves in speech.

The purpose of the present experiment is to discover in how far they are reliable as alternates to the Stanford-Binet in the classification and adjustment of mental defectives having a mental age of 4 to 7 years. A correlation above 75 was not expected as no non-language nor performance test has yet been found which correlates above 75 with language tests. Also there are mental traits which are not tested by the scales in question but which are emphasized in the Stanford-Binet. These are, notably, practical social comprehension, auditory memory for words and numbers, orientation in time, and definition of words. The emphasis placed by non-language tests on visual discrimination and visual construction may also tend

[1] Acknowledgments are due to Dr. H. E. Garrett for consultation, and to Miss M. C. Outhit and Miss A. S. Bristol for assistance in testing and statistical computation.

to lower their correlation with language tests. As a unit to be used in a composite rating with language tests, this emphasis adds importance to the Rhode Island and Picture Game tests, since the value of a clinical picture depends on the number and vital significance of its elements.

SELECTION OF CASES

The subjects were taken from the school population of Children's Hospital, Randall's Island. They form a group selected from the lower end of the normal curve of distribution

TABLE 1

M.A.	NUMBER OF CASES		CHRONOLOGICAL AGE	NUMBER OF CASES		I.Q.	NUMBER OF CASES	
	R.I.	P.G.		R.I.	P.G.		R.I.	P.G.
4	18	17	5	1	1	30	3	2
5	37	26	6	6	4	40	14	10
6	42	25	7	13	11	50	30	21
7	3	1	8	19	14	60	32	23
	—	—	9	16	9	70	18	12
	100	69	10	16	13	80	3	1
			11	11	8		—	—
			12	12	7		100	69
			13	4	3			
			14	2				
				—	—			
				100	69			

and the findings are therefore applicable only to similar groups. Care was taken not to include records of children whose Stanford-Binet ratings are variable on account of lack of mental control, such as epileptic or hyperactive children or those whose ratings were probably lowered by motor handicaps or speech defects. The Stanford-Binet ratings had been made within a year of the time of the experiment. One hundred records were available for the Rhode Island test and 69 for the Town Picture Game. In these 69 cases the two tests were given alternately first and second to avoid uneven practice effects from one to the other. The remaining 31 cases added to the Rhode

Island distribution were given in rotation with other experimental tests of similar nature. The distribution according to chronological age, Stanford-Binet M.A. and Stanford-Binet I.Q. are as shown in table 1.

The tests were given to groups of 4 or 5 children with a monitor for each group. Those having a mental age of 4 years proved to be less adaptable to group testing and required individual supervision. Both scales were popular with the children and for those making low scores the task was still interesting and not too long.

SCORING

The printed directions for scoring were followed, but it was found necessary to devise a rating scale for the scoring of the squares and diamonds in the Picture Game in order to secure comparable results of different workers. The squares and diamonds were arranged in groups from 0 to 7 for squares, and 0 to 8 for diamonds by two experienced examiners. Representative samples of each group were then used as scoring guides. This method obviated the vagueness resulting from trusting the "judgment of the examiner."

STATISTICAL METHODS

The Pearson Product Moment method was used in finding the correlations. The Town Picture Game has no mental age norms but only kindergarten and first grade percentiles. The Rhode Island Test has age medians but it was found on inspection that 48 of our 100 cases would fall below the 3 year norm, making a classification which would obviously be unfair to the group. The Rhode Island score of a kindergarten group having an average chronological age of 5 years 3 months have also been reported (3) but since the distributions are not recorded, a comparison with the present findings cannot be made. Raw scores of both tests were therefore used to find the correlations and regressions. The results are given in table 2.

The validity of these scales as measures of 4, 5, and 6 year mentality according to Stanford-Binet is tested by the applica-

TABLE 2

M.A. vs. Raw Score		
S.B.	Rhode Island Test.	$r = +0.559 \pm 0.05$
S.B.	Town Picture Game.	$r = +0.736 \pm 0.04$
I.Q. vs. Raw Score		
S.B.	Rhode Island Test.	$r = +0.217 \pm 0.06$
S.B.	Town Picture Game.	$r = +0.184 \pm 0.07$
Chronological Age vs. Raw Score		
	Rhode Island Test.	$r = +0.133 \pm 0.07$
	Town Picture Game.	$r = +0.334 \pm 0.07$

Rhode Island Test vs. Town Picture Game
$r = +0.70 \pm 0.04$

	S.B.	R.I.	P.G.
Range	2σ	2.3σ	2.4σ
Skewness	-0.206	$+0.699$	$+0.68$

TABLE 3

Rhode Island Test	
$\frac{D}{\sigma \text{ diff.}}$	(M.A. 4 and M.A. 5) = 2.99 (M.A. 5 and M.A. 6) = 4.39
Town Picture Game	
$\frac{D}{\sigma \text{ diff.}}$	(M.A. 4 and M.A. 5) = 3.9 (M.A. 5 and M.A. 6) = 4.63

tion of the formula $\frac{D}{\sigma \text{ diff.}}$: The number of 4 year olds is too small to give more than an indication of what the true findings would be.

These figures (table 3) indicate perfect reliability. The

findings are, however, conditioned by the limited range and slight skewness of the distributions.

We are justified therefore, in using the Rhode Island Intelligence Test and the Town Picture Game as rough measures of mental age when Stanford-Binet is the criterion. The low correlations with life age and I.Q. confirm the observation of examiners that success depends largely on mental development rather than age. In the classification of children for kindergarten or first grade work these scales should be especially useful.

The transmuted scores are shown in table 4.

TABLE 4

MENTAL AGE	NORMS
Rhode Island Intelligence Test	
4 years 7 months	1
5 years	6
6 years	19
6 years 9 months	28
Town Picture Game	
4 years 2 months	1
5 years	30
6 years	64
7 years 1 month	100

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A NOTE ON SOME THEOREMS CONCERNING THE ARITHMETIC MEAN AND THE STANDARD DEVIATION

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It is well known that in the simple mathematical relationship existing between a sum and its components, the standard deviation of the sum is expressed by

$$\sigma^2 = \sigma_1^2 + \sigma_2^2 \pm 2\, r\sigma_1\sigma_2 \qquad (1)^1$$

If the additive factors are uncorrelated, we have the important special case

$$\sigma^2 = \sigma_1^2 + \sigma_2^2 \qquad (2)$$

It is not so well known that similar formulas can readily be derived for non-additive factors. Multiplication and dividing factors are among the most important of those which do not combine by addition. The following demonstrations give some of the resulting formulas.

(*a*) Theorem. To find the mean of a product in terms of the means, the standard deviations, and the coefficient of correlation of two given series.

Let x and y be the absolute sizes of the two given series; m_1 and m_2 the mean values; σ_1 and σ_2 the standard deviations; ϵ_1 and ϵ_2 the deviations from the respective means, i.e., $x = m_1 + \epsilon_1$ and $y = m_2 + \epsilon_2$. Also let M be the mean value of the product xy, and n the total population.

We shall suppose throughout the demonstrations that the

[1] For the corresponding formula for the arithmetic mean see: Neifeld, M. R. Formulas for Facilitating the Computation of the Mean, etc. Jour. Educat. Psychol., December, 1924, pp. 588–591.

ratios of the deviations of the mean values are so small that their cubes may be neglected.

Then

$$z = xy$$

and

$$\begin{aligned} nM &= S(xy) \\ &= S[(m_1 + e_1)\ (m_2 + e_2)] \\ &= S(m_1m_2 + m_1e_2 + m_2e_1 + e_1e_2) \\ &= nm_1m_2 + m_1S(e_2) + m_2S(e_1) + S(e_1e_2) \end{aligned}$$

Since

$$S(e) = 0$$

and

$$S(e_1e_2) = nr\sigma_1\sigma_2$$

$$\therefore nM = nm_1m_2 + nr\sigma_1\sigma_2$$

$$M = m_1m_2 + r\sigma_1\sigma_2 \tag{3}$$

If x and y are uncorrelated

$$M = m_1m_2 \tag{4}$$

(*b*) Theorem. To find the standard deviation of a product in terms of the means, the standard deviations, and the coefficient (of correlation) of two given series.

$$\begin{aligned} n\Sigma^2 &= S(M - xy)^2 \\ &= S[m_1m_2 + r\sigma_1\sigma_2 - (m_1m_2 + m_1e_2 + m_2e_1 + e_1e_2)]^2 \\ &= S(r\sigma_1\sigma_2 - m_1e_2 - m_2e_1 - e_1e_2)^2 \end{aligned}$$

Expanding, neglecting cubes, simplifying, and recalling that $S(\epsilon^2) = n\sigma^2$, we have

$$\Sigma^2 = m_1^2\sigma_2^2 + m_2^2\sigma_1^2 - r^2\sigma_1^2\sigma_2^2 + 2m_1m_2r\sigma_1\sigma_2$$

or

$$\Sigma = m_1m_2\sqrt{v_1^2 + v_2^2 + 2rv_1v_2 - r^2v_1^2v_2^2} \tag{5}$$

where

$$v = \frac{\sigma}{m}$$

If x and y are uncorrelated

$$\Sigma = m_1 m_2 \sqrt{v_1^2 + v_2^2} = M \sqrt{v_1^2 + v_2^2} \tag{6}$$

For the coefficient of variation of a product we have:

$$V = \frac{\Sigma}{M} = \frac{m_1 m_2 \sqrt{v_1^2 + v_2^2 + 2rv_1v_2 - r^2v_1^2v_2^2}}{m_1 m_2 + r\sigma_1\sigma_2}$$

$$V = \frac{\sqrt{v_1^2 + v_2^2 + 2rv_1v_2 - r^2v_1^2v_2^2}}{1 + rv_1v_2} \tag{7}$$

If x and y are uncorrelated

$$V = \sqrt{v_1^2 + v_2^2} \tag{8}$$

It is obvious that the results of (*a*) and (*b*) can easily be generalized.

Dividing factors can be handled by taking reciprocals and using (*a*) and (*b*). The following theorems are concerned with the relations existing between reciprocals.

(*c*) Theorem. To find the mean of a reciprocal in terms of the mean and the standard deviation of a given series.

Here

$$M = \frac{S\left(\frac{1}{x}\right)}{n} = \frac{1}{n} S\left(\frac{1}{m + \epsilon}\right) = \frac{1}{n} S(m + \epsilon)^{-1}$$

$$= \frac{1}{nm} S\left(1 + \frac{\epsilon}{m}\right)^{-1}$$

$$= \frac{1}{nm} S\left(1 - \frac{\epsilon}{m} + \frac{\epsilon^2}{m^2}\right)$$

$$= \frac{1}{nm}\left[n - \frac{S(\epsilon)}{m} + \frac{S(\epsilon^2)}{m^2}\right]$$

or

$$M = \frac{1}{nm}\left(n + \frac{n\sigma^2}{m^2}\right)$$

$$= \frac{1}{m}(1 + v^2) \tag{9}$$

(*d*) Theorem. To find the standard deviation of a reciprocal in terms of the mean and the standard deviation of a given series.

$$n\Sigma^2 = S\left[\frac{1}{x} - M\right]^2$$

$$= S\left[(m + \epsilon)^{-1} - \frac{1}{m}(1 + v^2)\right]^2$$

$$= \frac{1}{m} S\left[\left(1 + \frac{\epsilon}{m}\right)^{-1} - (1 + v^2)\right]^2$$

$$= \frac{1}{m} S\left[1 - \frac{\epsilon}{m} + \frac{\epsilon^2}{m^2} - 1 - v^2\right]^2$$

Expanding, neglecting cubes, and simplifying

$$n\Sigma^2 = \frac{1}{m}\left[\frac{n\sigma^2}{m^2} + nv^4 - \frac{2v^2}{m^2} n\sigma^2\right]$$

$$\Sigma^2 = \frac{1}{m}[v^2 + v^4 - 2v^4] = \frac{1}{m}[v^2 - v^4]$$

$$= \frac{v^2}{m^2}[m - v\sigma]$$

and

$$\Sigma = \frac{v}{m}\sqrt{m - v\sigma} \tag{10}$$

For the coefficient of variation of the reciprocal we have:

$$V = \frac{\Sigma}{M} = \frac{\frac{v}{m}\sqrt{m - v\sigma}}{\frac{1}{m}(1 + v^2)}$$

or

$$V = \frac{v\sqrt{m - v\sigma}}{1 + v^2} \tag{11}$$

NOTES AND NEWS

Columbia University announces a new course on Discussion Leadership under the joint auspices of the University Extension and of a private organization interested in adult education, called the Inquiry. It is the first course of its kind offered anywhere and aims "to provide an opportunity for those who wish to equip themselves for leadership of group meetings, classes, committees, conferences and assemblies conducted on a discussion basis."

So far, there are few practitioners who master this art of discussion leadership. To some extent it is, like every art, a matter of taste and intuition; but the psychology of the process is no longer a complete mystery, and much of the technique can be taught.

The Seventh Annual Educational Conference sponsored by the Ohio State University will be held at that institution on April 7, 8 and 9, 1927. Men of national note, such as Professor E. L. Thorndike of Teachers College, Columbia University, Professor Wallace W. Atwood of Clark University, Judge Olson of the Juvenile Court of Chicago, Payson Smith, Commissioner of Education for Massachusetts, and others will address the general sessions. To sectional meetings of which this year there will be more than thirty specialists in their fields will contribute as, for example, Professor S. A. Courtis of Michigan in the Educational and Intelligence Test Section; Professor S. A. Leonard of Wisconsin in English; Professor Hill of Illinois in Non-biological Science, etc. The keynote of this year's conference is "Expertness in Teaching" and the whole program, both general and sectional, will center around this idea.

The Carnegie Foundation for the Advancement of Teaching has announced the early publication of "Games and Sports in British Schools and Universities," Bulletin Eighteen of the Foundation. The author, Dr. Howard J. Savage, staff member of the Foundation, spent several months in Great Britain gathering materials for this first American descriptive study of athletics in British educational institutions. The Bulletin describes sport in its relation to education at English public and day schools, Oxford and Cambridge, the newer English universities, like London, Liverpool, Leeds, and Birmingham, and the universities of Scotland and Ireland. It also discusses British athletic tradition and presents probably the first summary of the history

of the amateur status in England. There are a few comparisons with conditions in America, but since the Foundation is at present engaged upon a study of American school, college, and university athletics, most of these comparative considerations are deferred.

Some of the conclusions of the study may be summarized as follows: athletics in British schools and universities are valued partly for their physical effects but more for their socializing influences. Although they are not formally recognized by any university, they are aided by Oxford and Cambridge colleges and by many of the newer universities. Most schools insist, in one way or another, upon participation in games, but no university compels any undergraduate to take part. "At all universities, sport is essentially casual." Athletics are subordinate to studies, but the lessons learned on the playing fields are carried over into all phases of school and university life, inside the classroom and out. While personal athletic prowess is highly esteemed, the reputation that victories can bring to institutions counts for comparatively little. Participation being play in the strict sense of the term, the line between the amateur and the professional has come to be strictly drawn in most branches of athletics, nominally drawn in all. Very few persons are dependent upon school, college, or university sport for their livelihood, and no such person, whether coach or trainer, depends upon victory for his living.

College and university athletics in England, and especially in Scotland, are probably much less costly than in the United States, and admission charges to games are far lower. This condition is accounted for partly by the fact that participants provide their own equipment, and at Cambridge and Oxford pay comparatively high dues to various athletic clubs.

"It is probable," writes Dr. Savage, "that athletic inducements do exist or have existed at both Cambridge and Oxford." That they do not constitute a serious abuse is probably due, first, to the integrity and good sense of college administrators; secondly, to a similar, and indeed a traditional, attitude on the part of graduates of the older universities; and, thirdly, to the standards set and maintained by the representative athletic bodies respecting the amateur status and the general cleanness of sport, which university and public-school men exert a very great influence in creating and maintaining.

According to estimates presented in the Bulletin, half of the Oxford and Cambridge undergraduate bodies take part in rowing and three-fourths in all sports, while 75 per cent are doing special work leading to an honors degree. From these facts there would appear to be no conflict between athletics and studies at these older institutions, and still less at the newer English and Scottish universities, where only from 8 to 20 per cent participate in athletics. Universities like Birmingham,

Liverpool, Edinburgh, and Glasgow are building up athletics by means of money grants for playing fields and general expenses.

Oxford and Cambridge men who enter the British civil service, business, and teaching admittedly find better positions and have a better chance of success if they have won the university blue which corresponds to the letter in American college athletics.

For some years the Soudan civil service has been practically recruited from the ranks of the old Blues. Since the war the value of the blue in business, whether in manufacturing or in selling, has greatly increased. As for teaching, it is often said that an English school had rather have on its staff an old Blue than a First Class Honors man. Partly for these reasons the prestige that the blue can give in England makes the American letter pale by comparison.

Copies of this Bulletin and of the Twentieth Annual Report of the Foundation, which on pages 132–136 deals with American college athletics, may be had without charge on application by mail or in person to the office of the Foundation, 522 Fifth Avenue, New York City.

Seeking to build up the spirit of workers, *Industrial Psychology* has announced a gold award for the best articles upon morale. Describing morale as the mobilization of enthusiasm and interest in behalf of a corporate purpose, the editors of the magazine declare that this has been developed in the past chiefly by trial and error methods. Dr. Donald A. Laird, of Colgate University, the editor, states that the award has been offered to discover a proven, scientific solution to the problem.

Ordway Tead, business book editor of Harper & Brothers is chairman of the special jury of the award. Others on the jury are Walter V. Bingham, president of the Psychological Corporation, Henry S. Dennison, president of the Dennison Manufacturing Company, William E. Hocking, professor of philosophy at Harvard, and Whiting Williams, well known student of labor from Cleveland. Individuals, groups or corporations may submit proposals for strengthening the morale of America's workers. Inquiries should be addressed to *Industrial Psychology*, Hamilton, N. Y. Manuscripts must be submitted before October 1, 1927.

In connection with the Eastman School of Music Mr. George Eastman of Rochester has made available at the State University of Iowa three fellowships yielding $800, $1200, and $1600 respectively, with reduced tuition, for the study of certain applications of psychology to the teaching of music. Candidates who have advanced standing as graduate students in psychology and music will be preferred. Applications for appointment should be made to C. E. Seashore, Iowa City, Iowa.

At the annual meeting of the Board of Directors of the Psychological Corporation officers were unanimously elected as follows: President, Walter V. Bingham; First Vice President, Walter Dill Scott; Second Vice President, Lewis M. Terman; Chairman of the Board, J. McKeen Cattell; Secretary and Treasurer, Paul S. Achilles; Assistant Secretary, Elsie O. Bregman. Dr. Cattell writes as follows: It is a privilege to communicate to those associated in the work of the Psychological Corporation the election of Dr. Bingham, who is designated for the presidency by his leadership in the promotion of applied psychology and his directorship of the Personnel Research Federation. We were also fortunate in being able to elect as secretary Dr. Achilles who is associated with Dr. Bingham as an officer of the Personnel Research Federation. The retiring president has appreciated the opportunity of taking an active part in organizing the work of the Psychological Corporation and remained its executive officer longer than he had planned. His experience has continually increased his appreciation of the value of the work that the corporation can accomplish in the organization of psychologists to advance research in psychology on an economic basis, to extend the applications of psychology and to maintain high standards in its practice. There have been difficulties in earning money sufficient to pay the salary of a secretary and the rent of an office, but these are small in comparison with the importance of what the corporation has done and may hope to do in increasing measure. In carrying forward the work of the Psychological Corporation the administration needs and should have the active cooperation of all psychologists.

NEW BOOKS AND PAMPHLETS RECEIVED*

Books and pamphlets for review should be sent to James P. Porter, Department of Psychology, Ohio University, Athens, Ohio.

Animal Mind, The. MARGARET FLOY WASHBURN. The Macmillan Company.

Annual Report of the Commission on Scholastic Aptitude Tests. September 1926. College Entrance Examination Board, New York. 38 pp.

Basic Material for a Pharmaceutical Curriculum. W. W. CHARTERS, A. B. LEMON, AND LEON M. MONELL. McGraw-Hill Book Company, New York. 366 pp.

Child Labor in Massachusetts. RAYMOND G. FULLER AND MABEL A. STRONG. Massachusetts Child Labor Committee, Boston, Mass. Price $1.00. 160 pp.

The Delinquent Boy. JOHN SLAWSON. Richard Badger, Boston, Mass. 471 pp.

The Development of Motor Co-ordination in Young Children. BETH WELLMAN. University of Iowa Press, Iowa City, Iowa. 93 pp.

Education of Defectives in The Public Schools. META L. ANDERSON. World Book Company, Yonkers, N. Y. 104 pp.

Factors of Human Psychology. LAWRENCE W. COLE. University of Colorado, Boulder, Colo. 362 pp.

Guidance for College Women. MABELLE BABCOCK BLAKE. D. Appleton Company. $2.50. 285 pp.

Guide to Educational and General Psychology. JOHN P. WYNNE. Globe Book Company, New York City. $1.34. 85 pp.

How to Make Courses of Study in the Social Studies. M. E. HERRIOTT. University of Illinois, Urbana, Ill. 51 pp.

An Investigation of the Development of the Sentence and The Extent of Vocabulary in Young Children. MADORAH ELIZABETH SMITH. University of Iowa, Iowa City, Iowa. Studies in Child Welfare, Vol. III, No. 5. 93 pp.

The Learning Process in Young Children. JULIA A. KIRKWOOD. Studies in Child Welfare, Vol. III, No. 6, University of Iowa Studies. Iowa City, Iowa. 108 pp.

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* Mention here does not preclude further comment.

Man. HORATIO V. GARD. Golden Rule Magazine, Chicago, Ill. $3.50. 356 pp.

The Measurement of Conation. RAPHAEL C. MCCARTHY. Loyola University Press, Chicago, Ill.

The Natural History of Our Conduct. WILLIAM E. RITTER. Harcourt, Brace & Company. $3.50. 339 pp.

A Psychological Study of Cancer. ELIDA EVANS. Dodd, Mead & Company.

A Short Outline of Comparative Psychology. C. J. WARDEN. W. W. Norton & Company, New York. 96 pp.

Student Relationships. WALTER G. CLIPPINGER. Thomas Nelson & Sons, N. Y.

Studies in Psychometric Theory. ELMER CULLER. Journal of Experimental Psychology. Vol. IX, Nos. 3 and 4. 52 pp.

Team-Work in the Prevention of Crime. RALPH P. TRUITT. Joint Committee on Methods of Preventing Delinquency, 20 E. 42nd Street, New York.

Occupations for Women. O. LATHAM HATCHER. Southern Woman's Educational Alliance, 401 Grace American Building, Richmond, Va. 527 pp.

On Thermal Sensitivity and the Nature of Sensory Adaptation. ELMER CULLER. British Journal of Psychology, Vol. XVI, Part 3. Cambridge University Press. 6 pp.

Vocational Guidance of College Students. LEWIS A. MAVERICK. Harvard University Press, Cambridge, Mass. $2.50. 251 pp.

A LIST OF CONTRIBUTIONS TO EDUCATION, BY THE BUREAU OF PUBLICATIONS, COLUMBIA UNIVERSITY, NEW YORK

The Accessibility of Rural Schoolhouses in Texas. ALBERT S. BLANKENSHIP.

Business Management of Institutional Homes for Children. LEONARD BLISS JOB.

Children's Thinking. INGA OLGA HELSETH.

Comparative Psychology and Hygiene of the Over-Weight Child. KATHRYN MCHALE.

A Comparative Study of Different Methods Used in Teaching Beginners to Write. OSCAR EDWARD HERTZBERG.

Contribution of the Arabs to Education. KHALIL A. TOTAH.

Health Problem Sources. MARION OLIVE LERRIGO.

How to Construct the True-False Examination. CHARLES CONRAD WEIDEMANN.

Job Analysis and Curriculum Construction in the Metal Trades Industry. WALTER B. JONES.

The Measurement of Intelligence. E. L. THORNDIKE.

The Organization and Objectives of State Teachers Associations. JOHN GRANRUD.

Rating Elementary School Courses of Study. FLORENCE B. STRATEMEYER AND HERBERT B. BRUNER.

The Relation Between Association and the Higher Mental Processes. J. W. TILTON.

Scheubel As An Algebraist. MARY S. DAY.

Students' Use in Leisure Time of Activities Learned in Physical Education in State Teachers Colleges. ETHEL J. SAXMAN.

A Study of Teacher Training in Vermont. ROBERT MCCURDY STEELE.

Subject Matter in Health Education. RUTH STRANG.

Tests of Literary Vocabulary for Teachers of English. LAURA H. V. KENNON.

The Unevenness of the Abilities of Dull and of Bright Children. ANDREW W. BROWN.

Valid Diagnosis in High School Composition. MATTHEW H. WILLING.

Directory of American Psychological Periodicals

American Journal of Psychology—Ithaca, N. Y.; Morrill Hall.
Subscription $6.50. 600 pages annually. Edited by M. F. Washburn, K. M. Dallenbach, M. Bentley, E. G. Boring. Quarterly. General and experimental psychology. Founded 1887.

The Pedagogical Seminary and Journal of Genetic Psychology—Worcester, Mass.: Clark University. Subscription $7. 700 pages annually. Edited by Carl Murchison and an international co-operating board. Quarterly. Child behavior, differential and genetic psychology. Founded 1891.

Psychological Review—Princeton, N. J.: Psychological Review Company.
Subscription $4.25. 480 pages annually.
Bi-monthly. General. Founded 1894. Edited by John B. Watson.

Psychological Bulletin—Princeton, N. J.: Psychological Review Company.
Subscription $5. 720 pages annually. Psychological literature.
Monthly. Founded 1904. Edited by Samuel W. Fernberger.

Psychological Monographs—Princeton, N. J.: Psychological Review Company.
Subscription $5.50 per vol. 500 pp. Founded 1895. Ed. by Shepherd I. Franz.
Published without fixed dates, each issue one or more researches.

Psychological Index—Princeton, N. J.: Psychological Review Company.
Subscription $1.50. 200 pp. Founded 1895. Edited by Walter S. Hunter.
An annual bibliography of psychological literature.

Journal of Philosophy—New York; 515 W. 116th St.
Subscription $4. 728 pages per volume. Founded 1904.
Bi-weekly. Edited by F. J. E. Woodbridge and Wendell T. Bush.

Archives of Psychology—Sub-Station 84, N. Y.: Archives of Psychology.
Subscription $5. 500 pp. ann. Founded 1906. Ed. by R. S. Woodworth.
Published without fixed dates, each number a single experimental study.

Journal of Abnormal Psychology and Social Psychology—Albany, N. Y.
Subscription $5. Boyd Printing and Publishing Co. Edited by Morton Prince in co-operation with Floyd H. Allport.
Quarterly. 432 pages annually. Founded 1906. Abnormal and Social.

Psychological Clinic—Philadelphia: Psychological Clinic Press.
Subscription $2.50. 288 pages. Ed. by Lightner Witmer. Founded 1907.
Without fixed dates (9 numbers). Orthogenics, psychology, hygiene.

Training School Bulletin—Vineland, N. J.: The Training School.
Subscription $1. 150 pp. ann. Ed. by E. R. Johnstone. Founded 1904.
Monthly (10 numbers). Psychology and training of defectives.

Comparative Psychology Monographs—Baltimore: Williams & Wilkins Co.
Subscription $5. 500 pages per volume. Edited by W. S. Hunter.
Published without fixed dates, each number a single research.

Psychoanalytic Review—Washington, D. C.: 3617 10th St., N. W.
Subscription $6. 500 pages annually. Psychoanalysis.
Quarterly. Founded 1913. Ed. by W. A. White and S. E. Jelliffe.

Journal of Experimental Psychology—Princeton, N. J.
Psychological Review Company. 480 pages annually. Experimental.
Subscription $4.25. Founded 1916. Bi-monthly. Ed. by Madison Bentley.

Journal of Applied Psychology—Baltimore: Williams & Wilkins Co.
Subscription $5. 400 pages annually. Founded 1917.
Quarterly. Edited by James P. Porter and William F. Book.

Journal of Comparative Psychology—Baltimore: Williams & Wilkins Co.
Subscription $5. 500 pages annually. Founded 1921.
Bi-monthly. Edited by Knight Dunlap and Robert M. Yerkes.

Journal of Personnel Research—Baltimore: Williams & Wilkins Co.
Subscription $5.00. 500 pages approximately. Edited by Walter V. Bingham, Lewis L. Thurstone, and Clarence S. Yoakum. Monthly.

Genetic Psychology Monographs—Worcester, Mass.: Clark University.
Subscription $7. 600 pages annually. Edited by Carl Murchison and an international cooperating board.
Bi-monthly from January, 1926. Each number one complete research. Child behavior, differential and genetic psychology. Founded 1925.

Psychological Abstracts—Princeton, N. J.
Subscription $6.00. 600 pages ann. Edited by W. S. Hunter. Monthly.
Abstracts of psychological literature. Founded 1927.